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# ANNUAL REPORT

ON THE

## PROGRESS OF PHARMACY,

Read before the American Pharmaceutical Association at its Seventeenth Annual Meeting,

Held at Chicago, September, 1869,

BY

*Presented by  
J. B. Hendon*

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(Reprint from the Proceedings of the American Pharmaceutical Association.)

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# REPORT ON THE PROGRESS OF PHARMACY.

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## PREFATORY NOTICE.

The arrangement adopted in this report is in principle the same as introduced by Prof. Maisch in his report in 1862. It consists of the following seven parts :

1. Sketch of the general progress of pharmacy and collateral sciences.

2. Practical pharmacy.

3. Pharmacognosy or *materia medica*.

4. Pharmaceutical chemistry.

5. Pharmaceutical legislation, statistics, etc.

6. Obituary.

7. Pharmaceutical literature.

The selection and reproduction of the overwhelming amount of the material depending upon the labor and time of one person had necessarily to be restricted ; therefore publications the results of which were in the main already known, as well as all preliminary and unfinished announcements, which are to be the subject of future inquiries and reports, and all subjects properly belonging to the medical sciences and not to a collateral branch of pharmacy, have been omitted.

All reported matter has been as much as possible condensed, but to such an extent only as required to furnish a lucid substitute for the original sources.

The abundant and fruitful researches in theoretical chemistry have been accounted for so far only as they appeared to possess

some relative value for pharmacy either from their general or practical interest.

Since modern chemical philosophy with its notation and nomenclature has now gained so complete a foothold, it would have been an anachronism in a report on the progress of pharmaceutical sciences to disregard the rational views of the results of critical researches, or to disregard them with retrogressive skepticism. Modern nomenclature and classification have therefore been adopted in the following report and the notation of the respective authors.

Believing that criticism does not properly belong to the sphere of this report, which thereby would be swelled beyond the allowed or desirable size, I have omitted critical or additional notes, except in a few instances.

#### *Abbreviations.*

*A. J. Med. Sc.*—The American Journal of the Medical Sciences, Philadelphia.

*A. J. Ph.*—American Journal of Pharmacy, Philadelphia.

*A. J. Sc. & Arts.*—American Journal of Sciences and Arts. By Silliman and Dana.

*Ann. Ch. & Ph.*—Annalen der Chemie und Physik von Woehler, Liebig und Kopp.

*Ann. Ph. & Ch.*—Annalen der Physik und Chemie von Poggen-dorff.

*Ann. de Chim. et Phys.*—Annales de Chimie et de Physique.

*Arch. Ph.*—Archiv der Pharmacie. Halle.

*Arch. gén. de Med.*—Archives générales de Médecine. Paris.

*Ber. Deut. chem. Ges.*—Berichte der Deutschen chemischen Gesellschaft zu Berlin.

*Berl. Klin. Woch. Schr.*—Berliner Klinische Wochenschrift von Posner.

*Bullet. de la Soc. de Pharm.*—Bulletin de la Société de Pharmacie de Bruxelles.

*Ch. N. A. R.*—Chemical News, American Reprint, New York.

*Ch. Cent. Bl.*—Chemisches Centralblatt.

*Chic. Ph.*—The Chicago Pharmacist.

*Compt. Rend.*—Comptes Rendus des Séances de l'Académie des Sciences.



*Cosm.*—Cosmos.

*Dent. Cos.*—Dental Cosmos, Philadelphia.

*Deutsch. Ind. Z.*—Deutsche Industrie Zeitung.

*D. C.*—The Druggists' Circular and Chemical Gazette, New York.

*Ind. Blätt.*—Industrie Blätter von Hager und Jacobsen.

*Journ. de Ph. & Ch.*—Journal de Pharmacie et de Chimie.

*Journ. Franklin Inst.*—The Journal of the Franklin Institute.

*Journ. prakt. Ch.*—Journal für praktische Chemie von Erdmann.

*Journ. de ph. d'Anv.*—Journal de Pharmacie d'Anvers.

*Les Mond.*—Les Mondes.

*Lond. Ph. J.*—London Pharmaceutical Journal and Transactions.

*Med. Rec.*—The Medical Report, New York.

*Monit. Scient.*—Le Moniteur Scientifique.

*N. Jahrb. Ph.*—Neues Jahrbuch für Pharmacie von Dr. Vorwerk.

*N. Rep. Ph.*—Neues Repertorium für Pharmacie von L. A. Buchner.

*N. Tijdsch. Ph. in Nederl.*—Nieuw Tijdschrift voor de Pharmazie in Nederland.

*Pac. Med. & Sur. J.*—Pacific Medical and Surgical Journal, San Francisco.

*Ph. Centr. Halle.*—Pharmaceutische Centralhalle von Hager.

*Ph. Zeit.*—Pharmaceutische Zeitung, Bunzlau.

*Ph. Zeitsch. f. Russl.*—Pharmaceutische Zeitschrift für Russland.

*Polyt. Centr. Bl.*—Polytechnisches Centralblatt von Schnedermann und Boettcher.

*Polyt. Journ.*—Polytechnisches Journal von Dingler.

*Proc. Am. Ph. Ass.*—Proceedings of the American Pharmaceutical Association at the Sixteenth Annual Meeting, at Philadelphia, 1868.

*Proc. Brit. Ph. Conf.*—Proceedings of the Norwich meeting of the British Pharmaceutical Conference.

*Quart. Journ. Ch. Soc.*—Quarterly Journal of the Chemical Society, London.

*Quart. Journ. of Sc.*—Quarterly Journal of Science.

*Quart. Scienc. Rev.*—Quarterly Science Review.

*Schweiz. Woch. Ph.*—Schweizerische Wochenschrift für Pharmacie von Gruner.

*Wiener. Ak. Ber.*—Berichte der Akademie der Wissenschaften zu Wien.

*Wiggers Jahr. Ber.*—Jahresbericht über die Fortschritte der Pharmacognosie, Pharmacie und Toxicologie von Wiggers und Husemann.

*Wittst. Viert. Schrft. Ph.*—Vierteljahresschrift für praktische Pharmazie von Wittstein.

*Zeitsch. f. Ch.*—Zeitschrift für Chemie von Beilstein.

*Zeitsch. f. Analyt. Ch.*—Zeitschrift für Analytische Chemie von Fresenius.

*Zeitsch. d. oest. Ap. Ver.*—Zeitschrift des allgemeinen oesterreichischen Apotheker Vereins.

## BRIEF SKETCH OF THE PROGRESS OF PHARMACY AND ITS COLLATERAL SCIENCES.

The past year (of our Association) has equalled its preceding year on the track of scientific activity and practical success. New observations and deductions have been made; numerous researches and novel inventions have succeeded or culminated old ones. Chemistry, in common with Physics and Mechanics, has vastly added to the accumulated stores of our knowledge and achievements,

*The Chemistry of the Cosmos* is advancing from year to year. The curious fact of the transverse striation of the solar spectrum, observed in 1802 by Wollaston, and in 1814 by Fraunhofer, was converted into an instrument of chemical research by Bunsen and Kirchhoff, and has more recently culminated in the successful exposition of the material composition and relations of the celestial worlds, of the constitution of the sun, the fixed stars and the nebulae. Spectral analysis has also added new elements to the known terrestrial elementary substances; its application in analytical and technical chemistry is increasing, among which is its application in the manufacture of iron.

Prof. Thos. Graham discovered some time ago that the metals palladium, platinum, iron and others are capable of absorbing,



or occluding, as he terms it, nearly 1000 times their volume of hydrogen, and the idea has forced itself upon his mind that palladium and other metals with their occluded hydrogen probably are alloys of a volatile metal. Hydrogenium, in which the volatility of the one element is restrained by its union with the other, and which owes its metallic aspect equally to both constituents.

Organic Chemistry continues to be productive, comprising among its results the synthesis of several compounds. Berthelot's process of preparing formic acid by heating potassic hydrate in an atmosphere of carbonic oxide has been succeeded by Kolbe's and Schmidt's method of making the same acid by exposing potassium to a warm atmosphere of carbonic anhydride.

W. H. Perkins, in pursuing his interesting researches on the salicylic aldehyde, has succeeded in artificially producing Coumarin, the odoriferous principle of the sweet scented woodruff and the tonca beans.

One of the most interesting achievements in synthetical chemistry is Drechsel's preparation of oxalic acid by the direct union of carbonic anhydride and sodium. It has further been shown that, as oxalic acid by distillation yields formic acid, the synthesis of the first acid leads directly to a new synthesis of the second.

The vast domain of the Hydrocarbons, as well as that of the Alcohols and Ethers, have received numerous and valuable contributions, among which the most prominent ones are:—The researches and studies of Berthelot<sup>1</sup>, of R. Fittig, Jul. Vellguth, E. von Furtenbach and J. Stoerer<sup>2</sup>, of A. Wurtz<sup>3</sup> and Karl Græbe<sup>4</sup>. Berthelot's discovery of a universal method of transforming any organic substance into a hydrocarbon, with the amount of carbon unchanged, and the hydrogen a maximum, has been fruitful in theoretical chemistry. Valuable contributions on the constitution of alcohols and aldehydes have been furnished by F. Beilstein and A. Kuhlberg<sup>5</sup>, on the synthesis of the monatomic acids by L. Carius<sup>6</sup>, on citric acid and the

(1) Ann. Ch. und Ph. Suppl. 247. (2) Ibid. 1868. (3) Ibid. 1868. (4) Ibid. 1869. (5) Ibid. 1868. (6) Ibid. 1868.

citrates by H. Kämmerer<sup>1</sup>, and on the nitroprussids by W. Weith<sup>2</sup>. A. W. Hofmann's successful transformation of the aromatic monamines into acids richer in carbon have been extended<sup>3</sup>. Matthiessen's discovery of apomorphia is not only interesting in scientific chemistry, but seems to have furnished a valuable remedial agent<sup>4</sup>.

Isomerism has been the subject of the continued masterly researches of A. Hübner, A. Petermann and R. Biedermann.<sup>5</sup>

Among the valuable contrivances which have been contributed to practical chemistry, are Bunsen's filter air pump<sup>6</sup> and Crookes' spectro-microscope<sup>7</sup>.

Pharmaceutical chemistry and practical pharmacy have been enriched by the introduction of the dialysed and of the so-called soluble modifications of the ferric oxide preparations and by valuable contributions to our knowledge on the extracts and their preparation. The much disputed question about the decomposition of chloroform by light has finally been settled. Noteworthy essays in pharmaceutical chemistry are:—L. Riederer's method of detecting mercury in the animal organism<sup>8</sup>, Dragen-dorff's contributions to the detection of morphine and narcotine in the animal organism<sup>9</sup>, and his mode of separation of the alkaloids in forensic analysis<sup>10</sup>; Matthiessen's and Wright's discovery that meconin and cotarnine in opium extracts are the product of splitting of narcotine<sup>11</sup>; O. Hesse's continued researches on the cinchona alkaloids, recently extended to the modifications of quinidine<sup>12</sup>. Grandvall's method of preparing the extracts in the so-called vacuo, has found acknowledgment by its adoption in the new French codex, and has given rise to Prof. Schroff's investigations and comparative experiments with the various narcotic extracts.<sup>13</sup>

Valuable dissertations are L. Schoonbrodt's researches on the changes of vegetable drugs by desiccation,<sup>14</sup> and Schmieden's on the tannates in the vegetable kingdom.<sup>15</sup>

(1) Ibid. 1868. (2) Ibid. 1868. (3) Ch. N. A. R. Oct. 1868, 189. (4) Ch. N. A. R. Aug. 1869, 86. (5) Ann. Ch. und Ph. 1869. (6) Ch. N. A. R. 1869. (7) Ibid. 1869. (8) N. Rep. Ph. xvii, 257. (9) Ibid. xvii, 642 and 705. (10) Ibid. xvii, 281. (11) Proc. Norwich Meet. 1868, 57. (12) Ann. Ch. und Ph. 146, 257. (13) Zeitsch. d. Oest. Apoth. Ver. vi, 99. (14) Viert. Schrift. f. Ph. xviii, 73. (15) Ph. Zeitsch. f. Russl. 1868.

Foremost among the contributions to the science of pharmacognosy are Prof. Schroff's report on pharmaceutical drugs and preparations at the recent Paris exhibition<sup>1</sup>, and Fayk-Bey's essay on opium, which is perhaps one of the most comprehensive and lucid expositions ever published on this subject<sup>2</sup>.

Chemistry in its application to arts and trades is so fruitful a subject, and in many points so closely connected to pharmacy, that at least a few of its conspicuous achievements of especially practical interest may be mentioned. Such are the improvements in the manufacture and refining of cane and beet sugar. Lardani's discovery of the manufacture of sulphuric acid without the use of large, expensive leaden chambers<sup>3</sup>, the suggestion of a substitute for Leblanc's famous process for the manufacture of sodium carbonate from the chloride by means of chromium-sesquioxide,<sup>4</sup> and Graebe & Liebermann's beautiful discovery of the artificial preparation of alizarine by means of anthracene.<sup>5</sup>

The great interest in the improvements and discoveries of late years in the manufacture of iron and steel is still on the increase. The merits and alleged defects of the Heaton process<sup>6</sup> have undergone a searching examination at the hands of the iron-masters of Great Britain and Germany. So fierce has been the dispute over this important subject, that it is impossible to determine at present, after reading over the extensive literature of the controversy, whether the Heaton process is or is not one of the great discoveries.

Besides this, novel processes with similar results have been suggested by Siemens and Martin, by Park and Love, and by James and Jones, in England, and by G. W. Nasarow, in St. Petersburg.

The recent invention of M. Ellershausen, in Pittsburg, Pa., for refining crude cast-iron is being rapidly introduced into our iron works. If successful, it will greatly advance the problem of cheap iron. The process consists in the conversion of crude cast-iron, as it runs from the smelting furnace, into wrought iron, by the admixture of pulverized iron ore, whose oxygen combines

(1) N. Rep. Ph. 1868. (2) Journ. de Ph. et de Ch. 5. ser. vii, 37. (3) Dingl. Polyt. J. 187, 521. (4) Deut. Ind. Zeit. 1868, 521. (5) Ber. d. Deut. Chem. Ges. ii, 14. (6) Ch. N. A. R. 1868 and 1869.



with the carbon and the impurities, eliminating them as in the puddling process<sup>1</sup>.

Cheap chemical processes, most of them based upon the anti-septic properties of phenol, have been applied to the art of preserving animal food, which promise to remedy the deficient supply of meat in our large cities by drawing upon the abundant living herds in Texas, on the Prairies of the North American, and the Sierra's of the South American Continent.

Natural philosophy has been not less prolific. Electro-chemistry and electro-magnetism have been enriched by valuable and important contributions. The discovery by Edw. Becquerel, that capillarity is an electro-motive power is noteworthy, since its further prosecution cannot fail to bring on important results.

Wm. Crookes has improved the instrument and method of Arago's measurement of the luminous intensity of light<sup>2</sup>. Prof. Tyndall has added to the domain of chemical inquiry a new kind of physical experiment, remarkable for its simplicity of idea and for the plenty of its exceedingly beautiful phenomena. It consists in subjecting the vapors of volatile liquids to the action of concentrated sunlight or to the beam of the electrical light<sup>3</sup>.

The doctrine that light and heat are physically identical, and their differences are only relative differences due to our perceptions, has received a new evidence by Prof. Knoblauch's observation, that heat, like light, when transmitted through doubly refracting crystalline films, suffers interferences, so that in the polariscope, if the analyzing prism is rotated, the calorific rays transmitted in opposite azimuths are complementary to each other.<sup>4</sup>

A distinguishing peculiarity in natural philosophy of recent years is found in the relations between physical and biological sciences and the increasing prominence of the doctrine of the conservation and correlation of forces, which has been of great service in scientific generalization. This fruitful doctrine, however, has as yet failed to furnish any of the much hoped-for expositions of the phenomena of vegetable and animal life. To all appearances life cannot be resolved into a form of physical force. We have a

(1) Ch. N. A. R. July, 1869, 12. (2) Ch. N. A. R. Sept. 1868, 125.  
(3) Ibid. Feb. 1869, 65. (4) Poggend. Annal. 1868.

proximate explanation of the transmutation of electrical into magnetic energy; we can conceive how the magnet produces motion, how motion calls forth dynamic energies; we have a theory of the transformation of heat into molar force, of light into heat and *vice versa*, but all this knowledge gives no clue to the mystery of the conversion of heat, light, electricity and chemical force into the manifestations of vegetable life or into the muscular energy in a living being. Light and heat consumed and chemical actinism revived are complete equivalents; each represents the other; neither has suffered any change from association with the vital principle. The organic changes, therefore, are now regarded as equivalents of expended physical forces into which molar energy, when it disappears, is transformed. The old<sup>1</sup> truth, that no force is ever lost nor even created any more than matter, has now been established beyond doubt.

From a general point of view, this pregnant question stands alike in importance with Darwin's theory of the origin of species by natural selection, which is continually gaining ground among zoölogists and botanists. It is now widely admitted that all forms of life are the modified descendants of pre-existing ones.

When both these prominent doctrines of our day are now and then branded as controverting or setting aside a designating mind in nature and in the universe, such a misinterpretation is unjust, since they only relate to the forms and material changes and manifestations and not to the principle of life, still less to the moral or mental principles of the soul.

After a long period of indecision and struggles, as regards the equivalency and atomicity of a majority of the elements, it is gratifying to find that, at the present moment, an almost complete unanimity prevails among chemists. This unanimity, however, does not yet extend to notation and nomenclature.

To Dalton's "new system of chemical philosophy," which first introduced in 1804 the expression of atomic weight, and to Gerhard's division of volatile bodies into a majority whose recognized atoms correspond respectively with but two volumes; and from his suggestion, in conjunction with Laurent to

(1) Ovid. metamorph. Lib. xv. 252—260.

double the atomic weights of these last, so as to make the atoms of all volatile bodies, simple and compound, correspond each with four volumes of vapor, and finally to the ingenious conception and the concrete generalization of a few living philosophical master-minds, must be traced the vigorous development of the ~~natural~~ <sup>matured</sup> views which now prevail in chemical philosophy.

It would altogether surpass the boundaries of this report to incorporate therein a brief outline of the fundamental doctrines of modern chemical philosophy. To meet, however, the wishes of those who for one or the other reason probably have had no opportunity to familiarize themselves with the systematic organization of the structure of the chemical science, I subjoin a brief delineation of the systematic classification of the elementary as well as of the compound organic substances, as adopted by the majority of chemists.

This classification, by its logical consistency and organic combination, bears to the entire material of the chemical science a similar structural and generalizing relation, as for example, in botany, Jussieu's and DeCandolle's systematic organization does to Linnæus' ideal classification.

For any further information I refer to well-known standard works:—For the English literature, the tenth edition of Fownes' Manual of Chemistry, is perhaps the best exponent of modern chemistry, besides its antecedents, A. W. Hofmann's introduction into modern chemistry, and Watt's Dictionary of Chemistry. In the French language, A. Naquet's principes de chimie fondée sur les théories modernes, twelfth edition, and Ad. Wurtz, Histoire des doctrines chimiques depuis Lavoisier jusqu' à nos jours, are probably the most instructive manuals, while the German literature abounds in works on modern chemistry of unsurpassed excellence.

*Systematic classification of the elementary substances and of their compounds.*

1. The elements are divided into :—

*Monogens*, which combine in only one proportion, and in

*Polygens*, which are capable of uniting in two or more proportions.

*Monogens*: Hydrogen, Chlorine, Bromine, Fluorine, Silver, Potassium, Sodium, Lithium, Cæsium, Rubidium.

*Polygens* are all the other elements.

According to modern views, the equivalent weight of a polygenic element is the smallest quantity of it that can unite with an equivalent of a monogenic element; the atomic weight, or atom, is the smallest quantity of an element that can unite with others without introducing fractions of equivalents. With the monogenic elements the atomic and equivalent weights are identical, and can replace each other one by one, but the atomic weight of a polygenic element is always greater than its equivalent weight is, in the ratio of 1 to 2, 3, 4, &c. Therefore an atom of a polygenic element always takes the place of, or is equivalent to, two or more atoms of a monogenic element.

2. With respect to their equivalency or saturating power among themselves the elements are designated as:—

Univalent elements or Monads.

Bivalent “ “ Dyads.

Trivalent “ “ Triads.

Quadrivalent “ “ Tetrads.

Quinivalent “ “ Pentads.

Sexvalent “ “ Hexads.

Elements of even equivalency, viz., the dyads, tetrads and hexads, are also included under the general term *Artiads*, and those of uneven equivalency, viz., the monads, triads and pentads, are designated as *Perissads*.

Assuming that the true equivalency or atomicity of a polygenic element is that which corresponds with the maximum number of monad atoms with which it can combine, and that the maximum equivalence of a polygenic element is that which represents its normal mode of combination, the elementary bodies are classified as in the following table, in which the names of the so-called metalloids are printed in italics, those of the metals in Roman type, and the elements are further divided by horizontal lines into groups consisting of elements closely related in their chemical characters; in each of these groups the elements are arranged in the order of their atomic weights, beginning with the lowest:



*Classification of the elements according to their equivalency:—*

MONADS.	DYADS.	TRIADS.	TETRAADS.	PENTADS.	HEXADS.
<i>Hydrogen.</i>	<i>Oxygen.</i>	<i>Boron.</i>	<i>Carbon.</i>	<i>Nitrogen.</i>	<i>Sulphur.</i>
<i>Fluorine.</i>	Calcium.	Gold.	<i>Silicon.</i>	<i>Phosphorus.</i>	<i>Selenium.</i>
<i>Chlorine.</i>	Strontium.	Thallium.	Titanium.	Vanadium.	<i>Tellurium.</i>
<i>Bromine.</i>	Barium.		Tin.	Arsenic.	Chromium.
<i>Iodine.</i>	Beryllium.		Aluminium.	Antimony.	Molybdenum.
Lithium.	Yttrium.		Zirconium.	Bismuth.	Tungsten.
Sodium.	Lanthanum.		Rhodium.	Niobium.	
Potassium.	Didymium.		Ruthenium.	Tantalum.	
Rubidium.	Erbium.		Palladium.		
Cæsium.	Thorium.		Platinum.		
Silver.	Magnesium.		Iridium.		
	Zinc.		Osmium.		
	Cadmium.		Lead.		
	Copper.		Manganese.		
	Mercury.		Iron.		
			Cobalt.		
			Nickel.		
			Cerium.		
			Indium.		
			Uranium.		

3. The classification of organic compounds is based upon the equivalence or atomicity of carbon. This element is a tetrad, being capable of uniting with at most four atoms of hydrogen or other monatomic elements. Metham or marsh-gas,  $\text{CH}_4$ , for example, is therefore a saturated hydrocarbon, not capable of uniting directly with monad elements, but only of exchanging a part or the whole of its hydrogen for an equivalent quantity of another monad element, or by taking up any number of dyad elements or radicals, because such a radical introduced into any group of atoms whatever, neutralizes one unit of equivalency, and adds another, leaving therefore the combining power or equivalence of the groups just the same as before.

Accordingly the hydro-carbons take up, by substitution of a part or the whole of their hydrogen, any number of molecules of bi- or more valent compound radicals, and therefore form such an extensive series of compound radicals. From these hydro-carbon radicals, others of the same degree of equivalence may be derived by partial or total replacement of the hydrogen by other elements or compound radicals.

In fact all well-defined, organic compounds may be supposed to be formed by combination and substitution among those radicals, each entering into combination, just like an elementary body of the same degree of equivalence.

Accordingly the organic compounds may be arranged in the following classes :—

1. Hydrocarbons, containing even numbers of hydrogen atoms.
2. Haloïd ethers; compounds of hydrocarbons with halogens.
3. Alcohols; compounds of hydrocarbon radicals with hydroxyl.
4. Alcoholic oxides; compounds of hydrocarbon radicals with oxygen.
5. Sulphur and Selenium Alcohols and Ethers; compounds analogous in composition to the alcoholic oxides, the oxygen being replaced by sulphur or selenium. The sulphur and selenium alcohols are also called Mercaptans.
6. Acid Halides; compounds of oxygenated radicals with chlorine, bromine, iodine.
7. Organic acids; compounds of oxygenated radicals with hydroxyl.
8. Acid oxides, sometimes called anhydrous acids or Anhydrides.
9. Ethereal Salts or compound Ethers; compounds formed from acids by substitution of alcoholic radicals for hydrogen, just as metallic salts are produced by substitution of metals for the hydrogen in acids.
10. Aldehydes; compounds intermediate between alcohols and acids. They are produced by oxydation of alcohols, and are reconverted into the latter by the action of nascent hydrogen.
11. Ketones; compounds derived from aldehydes by the replacement of one atom of hydrogen by an alcohol radical.
12. Amines or Alcohol bases, or Compound Ammonias; compounds of alcohol radicals with amidogen ( $\text{NH}_2$ ), imidogen ( $\text{NH}$ ), and trivalent nitrogen.
13. Alcoholic Ammonium Compounds; compounds containing pentad nitrogen, and having the composition of ammonium salts in which the hydrogen is more or less replaced by alcohol radicals.

14. Phosphorus, Arsenic, and Antimony Compounds, analogous to the nitrogen compounds 12 and 13.

15. Organo-metallic bodies; compounds of hydrocarbon radicals with monad, dyad, and tetrad metals.

16. Amides; compounds exactly analogous to the amines, but with acid radicals instead of alcoholic radicals.

17. Amic Acids; acids consisting of a bivalent or trivalent acid radical combined with hydroxyl and with amidogen.

These classes, most of which have their analogues amongst inorganic compounds, include nearly all artificially prepared organic bodies, and the majority of those produced in the living organism. There are still, however, many compounds formed in plants and animals, the chemical relations of which are not yet sufficiently established so as to classify them with certainty. Such is the case with many vegetable oils and resins, with most of the alkaloids, and several definite compounds formed in the animal organism, as albumin, fibrin, casein and gelatin. Abstract from Fownes' Manual of Chemistry, 10th Edit.

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## PHARMACY.

### APPARATUS.

*Alcoholometer.* Berquier and Limousin have constructed an alcoholometer on the principle that the drops of an alcoholic liquid increase in size with the strength of alcohol. The instrument consists of a graduated glass-tube, of thirty centim. length, and one m. m. width, open on both ends. The lower is provided with a small suckling pump, through which the liquid is introduced into the tube. The percentage of the alcoholic liquid is found by the comparison of the number of drops falling from the instrument, and the volume of the liquid within the tube.

The instrument is the more valuable as its accuracy increases with the decrease of the alcoholic strength of the samples, and as substances contained in solution, as f. i. sugar, dextrin, gum, acids, etc., do not affect the reaction. It is, therefore, especially adapted to the alcoholometry for wines, beers, brandies, etc. Ph. Zeit. 1869, 7.

*Washing Precipitates.* To Prof. Bunsen we are indebted for a valuable apparatus for washing precipitates on filters: a so-called filter-air pump, whose mode of filtering depends not upon the removal of the liquid by successive attenuation, but upon its displacement by forcing the wash water through the precipitate by means of the atmospheric pressure.

Prof. Bunsen's paper, with illustration, is given in full in the June number of the Ch. N. A. R., 1869. This valuable contrivance has met with general acceptance. It is also being rapidly introduced into our American laboratories. For that of Yale College it has been constructed with some slight alterations, as described in Am. J. of Science and Arts, July 18th, 1869, p. 113.

*An apparatus for the same purpose*, and for continued filtration, was exhibited by H. B. Brady at the Norwich meeting of the Brit. Ph. Conf. The apparatus is described and illustrated in the London Ph. J., October, 1868, p. 216, and in Ch. N. A. R., December, 1868, 326.

*A Syphon Filter* of simple construction, especially adapted for the washing of gelatinous precipitates, has been constructed by E. Fleischer, of Dresden. It is described and illustrated in the Ch. N. A. R., June, 1869.

*Bunsen's Burner.* Ch. N. A. R., October, 1868, 185, gives the illustration and description of a simple apparatus, to be constructed over a Bunsen's burner for evaporation at low temperature.

*An apparatus for the extraction of drugs*, by means of ether, is described by Storch in Zeitsch. f. Anal. Chem., vii., 68.

*An apparatus for extraction by displacement*, (appareil à déplacement continu), by M. Latien, is described in Journ. de Ph. d'Anvers, xxiv, 193.

*Still.* C. O. Curtman describes and recommends, in Am. J. Ph. May, 1869, a pharmaceutical still, which, simple in construction, deserves, to all appearance, the attention of practical pharmacutists.

*Press.* Reynen has constructed a new screw press for the



pharmaceutical laboratory. N. Tijdschr. Ph. in Nederl., 1868, 232.

*Spectrum Microscope.* Wm. Crookes has recently constructed an improved spectrum microscope, which obviates the disadvantages of the ordinary hitherto used instrument. The principal features of the new apparatus are the sub-stage and the box of prisms. The former carries the sliding-plate to hold the slit and apertures, a spring stop and screws for adjusting them, and a reversed object-glass. The slit and this object-glass are about two inches apart, and if reflected light is passed along the axis of the instrument, the object-glass forms a very small image of the slit in front of it. The direct vision-prism consists of three flint and two crown, fitted in a box screwed into the end of the microscope. By means of a pin they are thrown in or out of action. The object-glass screws on in front of the prism box. By taking the illumination from the sky or a white cloud, Fraunhofer's lines are visible, and by direct sunlight they are seen in great perfection; the dispersion is sufficient to cause the spectrum to cover the whole field, and the achromatism of the lenses being nearly perfect, the lines from W to G are partially in the same focus. When the light is good the appearance of the spectrum and the power of grasping faint lines are greatly improved by dividing the light with a Wenham prism, and using both eyes; whilst the stereoscopic effect thereby communicated to some absorption and interference spectra throws a new light on the phenomena.

By using an alcohol lamp instead of the illuminating lamp, the instrument answers admirably for the examination of flame spectra. Quart. J. of Scienc., July, 1869, 464.

*Improved apparatus for the sublimation of benzoic acid* has been constructed by C. Rump. It consists of a circular kettle of sheet iron, which is placed upon a stove, and has a cover, through the centre of which a thermometer can be inserted. Two opposite sides of the kettle connect each with a six inch tube, six inches in length, and these are inserted into tubes three inches long, leading on each side into paper boxes forty-four inches in length and twenty-seven inches wide, at the extreme end of which a hole of four inches diameter is cut into the lid and sup-

plied with a tube one foot long. The benzole or benzoic acid is put into an iron or earthen-ware capsule, which is placed into the sheet-iron kettle. The opening in the cover allows the feeding of the apparatus after sublimation ceases. The cover may be kept heated to prevent condensation of the acid, which sublimes very regularly if the thermometer is kept at a temperature of 200 to 240° C. Luting is not required. N. Rep. Ph. xvii, 671.

#### OPERATIONS AND PROCESSES.

*Washing of Precipitates.* Prof. Bunsen has published, in the Annal. der Ch. und Ph., a valuable memoir on the washing of precipitates. The author deduces a mathematical formula for calculating the amount of water necessary for washing a precipitate, and describes his new vacuum filter and a tabula constructed from the formula calculated on mathematical deduction. London Ph. J., Feb., 1869, 487.

*Bumping of fluids while boiling.* M. Pollogio suggests a simple contrivance to prevent this troublesome phenomenon. It consists in placing through the cork of the retort a strong glass tube reaching near to the bottom of the retort, and bending the outer end of the tube rectangular, drawing its end to a fine point. If the liquid to be distilled corrodes the cork, a tube must be selected so wide as nearly to fill the aperture, and must be closed by a suitable lute. With this contrivance, strong sulphuric acid, crude pyrolignous acid and other fluids known as bumping when boiling, distill readily, and without bumping. Zeitsch. f. Anal. Chem. vi. 396.

E. Winkelhofer suggests for the *same purpose* the application of an electric current, led into the fluids to be distilled by means of suitable conducting wires. His method is completely successful. His contrivances are ingenious, but perhaps too complicated for general use. Ber. d. Deutsch. Chem. Ges. Mai, 1869.

*Saline solutions.* The phenomena presented by supersaturated solutions have occupied the attention of many inquirers. The fundamental fact on which the subject rests is quite remarkable, namely, that a strong, hot solution of a salt, such as that of sodic sulphate, on cooling in an open vessel, retains the salt in solution at ordinary atmospheric temperatures, and so be-

comes supersaturated, that is, capable of holding a much larger quantity of salt than the water could take up at this reduced temperature. Gay Lussac referred the state of supersaturation to the inertia of the saline molecules, as well as to the molecular condition of the sides of the vessel. Löwel, after an elaborate inquiry extending over many years, arrived at the conclusion that the state of supersaturation is one in appearance only, and not in fact; that a solution of the ordinary decahydrated sodic sulphate, for example, saturated at the boiling point, and cooling down in a closed vessel to about  $60^{\circ}$  F., changes its molecular condition into one of a more soluble salt, the hepta hydrated; that on a further reduction of temperature, crystals of the modified, or seven-watered salt, are deposited at the bottom of the solution. If, however, the vessel be opened, or the solution touched with an active nucleus, it instantly recovers the molecular condition of the ten-watered salt and becomes solid. As to the action of the air and other nuclei, Löwel regards it as the effect of one of those mysterious contact actions, known as catalytic, which lack any scientific explanation. Löwel's theory has generally been accepted as a satisfactory explanation of the existence of supersaturated solutions.

Recently Chs. Tomlinson, supported by a number of decisive experiments, combats Löwe's views as to the molecular change that leads to the formation of a more soluble modified salt, and substitutes an entirely new theory, to account for the formation of the modified salt. The conclusions arrived at by Chs. Tomlinson's experiments are:—1, that a number of hydrated salts form supersaturated solutions and remain so even at low temperatures, simply from the absence of a nucleus to start the crystallization. 2, That a nucleus is a body that has a stronger adhesion for the salt than for the water which holds the salt in solution, a state of things brought about by the absence of chemical purity. 3, That three or four salts form supersaturated solutions which, in cooling down, deposit a modified salt, or one of a lower degree of hydration than the normal salt. 4, That this modified salt is formed first by the deposit in small quantity of the anhydrous salt, which entering into solution, forms a denser lower stratum containing less water than the rest of the solution,

in which lower stratum the modified salt is formed. 5, That salts of a low degree of hydration form supersaturated solutions, which, on reduction of temperature or by action of a nucleus, deposit the excess of salt that held the solutions supersaturated, leaving them merely saturated; and 6, that anhydrous salts do not form supersaturated solutions. Ch. N. A. R., Sept. and Nov. 1868.

Oudemans gives, in Zeitsch. f. Analyt. Ch. vii, 419—223, schedules of the percentage of the solutions of a number of the most applied salts, determined by their specific gravity.

*Chemical change.* In order to discover the laws which govern the rate of any chemical change, A. V. Harcourt has instituted a series of experiments. The following propositions embody the principal conclusions to which his examinations have led:—1, The rate at which a chemical change proceeds is constant under constant conditions and is independent of the time that has elapsed since the change commenced. 2, When any substance is undergoing a chemical change, of which no condition varies, excepting the diminution of the changing substance, the amount of change occurring at any moment is directly proportional to the quantity of the substance. 3, When two or more substances act upon one another, the amount of action at any moment is directly proportional to the quantity of each of the substances. 4, When the rate of any chemical change is affected by the presence of a substance which itself takes no part in the change, the acceleration or retardation produced is directly proportional to the quantity of the substance. 5, The relation between the rate of a chemical change occurring in a solution, and the temperature of the solution, is such that, for every additional degree, the number expressing the rate is to be multiplied by a constant quantity. Ch. N. A. R., Sept. 1868, 117.

*Production of Cold.* According to Phipson, an intense degree of cold is produced by dissolving ammonium sulphocyanide in water. None of the many salts, lowering the temperature while dissolving, produce this effect so marvelously. Scient. Review, 1869.

*Protection for Porcelain Dishes in Crystallising.* For this pur-

pose paraffin has been suggested by Fr. Stolba. The paraffin is melted in the dishes, previously warmed in order to dry them completely, and heated till it commences to boil; the dishes are then turned so as to bring the paraffin in contact with the whole interior surface. After cooling it sticks perfectly; the solutions to be crystallised must of course not be heated, but left to spontaneous or vacuum evaporation. Journ. de Chim. & Ph., Aug. 1868.

*Igniting point of Vapors.* In commerce there are several substances which, at the ordinary temperature of the atmosphere, are sufficiently volatile to emit enough vapor to form, with atmospheric air, an explosive mixture. W. R. Hutton examined a number of such leading articles of commerce in order to establish the igniting point of their vapors. The proportion of volatile matters to be found in different crude commercial substances is variable, since they frequently are mixtures of several compounds of variable volatility; therefore no line for guidance is to be established, but in manufactured articles when more or less distinct volatile bodies are together in mixtures, the manufacturer has it in his power to exact a standard at which no vapor will evolve and no ignition occur. W. R. Hutton has devised a simple apparatus for estimating the igniting point of the vapors, and gives in a schedule the results of his experiments, stating the specific gravity and the temperature at which the substances examined emitted vapor and were ignited by a light in a distance of one and a half and half an inch. Ch. N. A. R. March, 1869, 123.

*Dangerous Inflammable Liquid.* Prof. Nicklès calls attention to the fact that when chloride of sulphur of commerce is mixed with bisulphide of carbon, wherein phosphorus has been previously dissolved, a fluid is formed, which, though emitting fumes when in contact with air, is harmless; on addition of liquid ammonia, however, or on passing into that liquid a few bubbles of ammonia gas, a most intense combustion ensues. This is due to the fact that the ammonia seizes upon the chloride of sulphur, forming ammonium chloride, whereby so much heat is set free as to cause the combustion of the carbon bi-sulphide and phosphorus dissolved in it. Ch. N. A. R., June, 1869, 322.



*Melting and Solidifying of Fats.* M. Wimmel has proved, by a series of elaborate experiments, that the generally accepted rule, that the degree of temperature of solidification and melting of solid fusible substances is exactly the same, does not hold good for fatty substances. Those properly so-called (which yield glycerine on decomposition) become solid at a temperature far less high than that at which they become fluid; substances like beeswax and spermaceti become solid immediately when their temperature falls below their melting point. M. Wimmel has found that when the solidification is retarded, there is always an increase of temperature when the solidification takes place. The fatty substance known as butter of mace becomes suddenly solid at  $33^{\circ}\text{C}.$ , and this solidification is accompanied by a sudden increase of temperature to  $42.2^{\circ}\text{C}.$ , while the melting point of this fat is  $45.5^{\circ}\text{C}.$  Some fats, like beef and mutton suet, do not become clear and quite transparent unless heated far above their melting point, while beeswax and spermaceti become transparent and clear long before they are entirely molten. Pogg. Annal. 133, 121.

*Reduction of Oxides by Hydrogen.* W. Mueller has instituted a series of experiments with the view to determine precisely the temperature at which the metallic oxides begin to be reduced by hydrogen gas. He has experimented with oxides of various metals prepared in various ways, and also determined the effect of other gases, nitrogen, and aqueous vapor, upon the temperature of incipient reduction. The experiments have also been extended to the chlorides and sulphides of some metals. Pogg. Annal. 136, 1869.

*On the influence of Drying on the active principles of Plants.* L. Schoonbrodt made a series of elaborate experiments and researches in order to determine the changes which the principal constituents of officinal plants undergo when dried. Wittst. Viert. Schrift. f. Ph. xviii, 73, contains an abstract of the assay and the following general conclusions:—1, The dried vegetables are in their effect never equal to the fresh ones. 2, In drying, the vegetables suffer more or less a change of their active principles. The volatile constituents are partly volatilized or oxidized. 3, For the preparation of the alkaloids the fresh vege-

tables are preferable. 4, The composition of the plants is far more simple than previously supposed. The so-called extractive substances are only the active principles of the plant, which, when pure, are mostly crystallisable; but they are united or mixed with the products of their own decomposition and transformation and with glucose and their oxydation products. 5, The various resins are the products of oxydation of volatile hydrocarbons; the volatile acids are the products of oxydation of volatile aldehyds or of oxygenated volatile oils which frequently occur together with hydrocarbons. Even the alkaloids and the glucosides are affected by continuous atmospheric action, and are subjected to modifications and splitting. 6, In all cases a rational and quick dessication of the drugs is preferable to a slow one.

#### COLLOIDS.

*Collodium*, which besides its durability coagulates blood, is recommended by Richardson; it is prepared by addition of tannin to the absolute alcohol before the preparation of the collodium. For certain cases the addition of carbolic acid is to be recommended. N. Jahrb. f. Ph. 28, 315.

#### DISTILLED WATERS.

Riding suggests, in the "Pharm. Presse, 1868, 206," as a means to restore orange flower water which has turned slimy; to shake it with calcined magnesia and filter.

(The same will hold good for other distilled waters.)

#### EXTRACTS.

*Grandval's Narcotic Extracts.* Dr. von Schroff has published a series of elaborate and valuable comparative experiments with the narcotic extracts with regard to their therapeutical value, and in particular with Grandval's excellent vacuum extracts.\* His paper is too extensive even for an abridged report; it is given in full in N. Rep. Ph. xvii, 321 and 453.

\*The process and apparatus for the preparation of extracts in vacuo were first made known by Grandval, in 1849. The apparatus was improved by Soubeiran & Gobley, in 1853, and the process has been brought to great perfection, and has been adopted in the new French Codex. Both have undoubtedly been the subject in former reports to this Association.

*Preparation of Alcoholic Narcotic Extracts.* The following process for the preparation of alcoholic extracts has been suggested by F. J. Kral:—To each pound of the fresh herb 3 oz. water are taken, and the whole mashed in a porcelain mortar to a pulp and expressed. After eight to ten days standing in a cool place, the decanted clear liquid is heated in a water-bath for five minutes to 75°C., and then again set aside for one day, when it is passed through a close strainer and the filtrate at once evaporated in a porcelain capsule at a temperature not exceeding 70°C., to a syrupy consistence, when it is allowed to cool, mixed with  $1\frac{1}{2}$  times its volume of strong alcohol, and the mixture digested for four days.

Meanwhile the wet residue upon the strainer is digested with  $1\frac{1}{2}$  times its weight of alcohol, then strained and the residue expressed. Both alcoholic liquids are now mixed, filtered and the filtrate concentrated either in vacuo or in a still by means of a steam-bath, and finally evaporated to the proper consistence.

Mixed with 4 parts of sugar or 3 p. sugar and 1 p. powdered liquorice root or milk-sugar and dried the powder keeps dry if kept in well-stoppered bottles. Zeitsch. d. oest. Apoth. Ver., 1869, 41-42, and A. J. Ph., July, 1869, 313.

*Improvement of Extracts by the addition of Glycerin.* M. Perron suggests the addition of some glycerin to the extracts as a suitable means of improving and preserving their quality and durability. The glycerin has to be added to the evaporating extracts before they thicken. Since the glycerin substitutes the water only very little is required. Perron did not try this method with resinous extracts, but thinks it will answer also. Journ. de Ph. & de Chim., 4 Ser. vii, 341.

This suggestion seems to be well worthy of further experiments.

*Yield of Drugs on Extracts.* M. Kohlmann published, in "Zeitsch. d. Allg. Oest. Apoth. Ver.," the result of elaborate and extensive experiments on the yield of vegetable drugs in extracts. Hager Centr. H. No. 15, 1869.

*Extract of Beef.* As the result of a series of comparative examinations of beef extract, Hager comes to the following con-

clusions as regards the standard of commercial extracts:—It must contain not more than 22 per cent. of humidity, and 25 to 27 per cent. parts not soluble in alcohol of 0·833 sp. gr. It must not yield a precipitate more than 20 per cent. of its weight with a solution of gallo-tannic acid and not more than 8 per cent. argentic chloride. Hager's Centr. H., 1869, No. 28.

#### FLUID EXTRACTS.

*Methods for the preparation of Fluid Extracts.* C. L. Diehl has instituted some preliminary experiments for the establishment of the best, at present, possible mode of making the fluid extracts in accordance with the present U. S. Pharmacopœia. The author comes to the conclusion that to all appearance fractional percolation is best adapted to almost all drugs, provided that the proper menstruum is selected, and the whole operation is effected with knowledge and skill. C. L. Diehl justly proposes to reduce the strength of our fluid extracts, so that in general eight troy ounces of the drug may be represented by one pint of the extract, as already is the case with the extracts of cinchona and wild-cherry bark.

C. L. Diehl suggests a general formula which divides the powdered drug into portions of 8, 5, 3 and 1 oz. and by which from the first 8 oz. of the drug 4 fluid-ounces of percolate are obtained for each troy-ounce of the drug, while from the second portion of 5 ounces, nearly 5 fluid-ounces, and from the third portion of 3 oz., six fluid-ounces of percolate are obtained for each troy-ounce of drug. Chicago Pharm., March, 1869.

S. P. Duffield uses and recommends the so-called vacuum maceration for the preparation of the fluid extracts. The process consists in extracting the drug by the menstruum in a cylinder after having exhausted the air. The resulting percolation forms the extract, and is fit for bottling after having deposited. A. J. Ph., Jan., 1869, 2.

*Extract of Squills.* C. L. Diehl, after some experiments on the best mode of preparing the fluid extract of squills, arrived at the conclusion that the active constituents of squills are completely represented by an alcoholic extract of the aqueous extract. On this basis C. L. Diehl suggests the following method

for preparing the fluid extract: 16 oz. squills are macerated for three days in four pints of water; strain and press; the residue is macerated for twenty-four hours in two pints of water; again strain and press. Evaporate the infusions separately as soon as obtained at a temperature not exceeding 150° F. When they have obtained a syrupy consistence mix them and evaporate to extractive consistence; this extract is then, while warm and stirred, mixed with eight times its volume of strong alcohol. To the residue is added as much distilled water as to make it measure eight fluid-ounces; to them add the same volume of recovered alcohol to make one pint fluid extract, which is perfectly transparent, dark brown and very bitter; after a time it deposits a slight precipitate, consisting principally of grape sugar.

This extract is well adapted to all preparations of squills. The Chicago Pharmacist, Vol. i, No. 2.

*Extract of Helianthemum Canadense.* H. Primm recommends the following formula for the fluid extract of frostwort: 16 oz. leaves, 16 oz. alcohol, 8 oz. sugar, water 9.5. The bruised leaves are macerated for 8 hours with 12 oz. of the alcohol, then percolated and the balance of the alcohol mixed with 4 oz. water added upon the percolator until the displaced liquid measures 12 oz., which are evaporated in a water-bath to 4 oz. The mark in the percolator is then macerated with one pint of cold water for 12 hours, and afterwards strongly expressed. The liquid of about 12 oz. is then evaporated to 8 oz. and mixed with 4 oz. previously obtained, and the sugar dissolved. A. J. Ph., Jan., 1869, 30.

(The increase in the use and sale of commercial fluid extracts calls forth the question: is there not some danger in pushing this trade in fluid extracts (and in powdered drugs)? How many or perhaps how few examine these commercial extracts? What guarantee has the practitioner for the goodness and strength of such extracts? They are as yet frequently bought and dispensed bona fide, and certainly open a wide field to temptation and fraud.)

#### MIXTURES

*Chlorodyne.* Squires "Companion to the Brit. Pharmacopoeia" contains the following formula for chlorodyne, one of the many



testimonia paupertatis of medicine:—chloroform 4 oz ; ether 1 oz ; alcohol 4 oz ; treacle 4 oz ; extract of liquorice  $2\frac{1}{2}$  oz ; morphia chloride, 8 grains ; oil of peppermint 16 minims ; syrup  $17\frac{1}{2}$  oz ; hydrocyanic acid (2 per cent.) 2 oz. D. C. Dec., 1868, 341.

*Ozonic Ether.* A mixture of hydrogen peroxide with ether and alcohol appears to be a stable combination, which, through its tendency of readily discharging active oxygen, seems to be an effective purifier of the air. This mixture was first made known by Dr. B. W. Richardson, under the name of ozonic ether. London Ph. J. Jan., 1869.

*Aromatic Sulphuric Acid.* Prof. Attfield ascertained, by repeated tests by means of various salts, that the aromatic sulphuric acid of the Brit. Pharmacop. contains no ethyl-sulphuric (sulpho vinic) acid. London Ph. J. Feb., 1869, 471.

*Liquor Opii Sedativus.* I. B. Groves publishes some researches on this mixture, and gives a formula for its preparation, which he recommends, not as a substitute for Battley's preparation, but for extract of opium of the Brit. Pharmacopoeia. London Ph. J. Jan., 1869.

*Glycerate of Tar.* J. B. Moore, in the Am. J. Ph. March, 1869, 115, gives a formula and mode for the extraction of the medicinal virtues of tar, previously trituted with magnesium carbonate by a menstruum of two parts glycerin, one part alcohol, and five parts water. This glycerate possesses all the virtues and properties of tar, of which thirty grains are represented in each ounce.

#### FATTY OILS.

*The extraction of fatty oils by means of Bisulphide of Carbon* is, according to the Preuss. Annal. der Landwirthschaft, successfully carried out on a large scale in Prussia, in the following mode: the oleaginous seeds, such as colza, linseed, mustard, rape, etc., are first cleaned on a sieve united with a winnower, and then passed into a triturator, the movements of whose cylinders are combined in such a way as to tear rather than bruise them. After this preparation the seeds pass into a revolving cylinder heated from below, whence they fall after desiccation into eight large vats, revolving on two horizontal axles. After having

closed the vats, the bisulphide of carbon is conducted into them. From the bottom of the vat the solution of oil in the bisulphide trickles out in thread-like manner, and becomes lighter, until at last the sulphide liquid runs quite colorless. This indicates the precise moment when the seeds are completely deprived of oil, and steam is then substituted for the sulphide, all traces of which are entirely removed. The vats are now uncovered and reversed, the exhausted residue is ejected upon lifts and passed successively through three mill-hoppers heated by steam. Lastly, it is ground, and forms an alimentary powder, containing 53 per cent. nitrogen.

The mixture of oil and bisulphide of carbon is then purified by steam, distilled twice, and afterwards rectified, which renders the bisulphide capable of employment in new operations. The oil obtained is purified according to its use, as burning-oil in illuminating lamps, for lubrication, or for other purposes in the arts and trades. Ch. N. A. R. Oct. 1868, 194.

*A new method of purifying Oils* has been suggested by M. Michaud. Prof. A. Chevalier describes the process in the *Bullet. de la societ. d'encourag. pour l'ind. nationale*, No. 196, April, 1869, thus: Michaud's process consists of a defecation of the raw oil by the simultaneous introduction of jets of air and thin streams of sulphuric acid, whereby those substances contained in the raw oil, which are injurious to its properties for use in lamps are coagulated and brought to the surface of the oil as a scum, which can be easily removed; the oil is next washed with water, afterwards heated by steam to  $100^{\circ}$  C., and lastly filtered through cotton and a layer of clean and pulverized marble, at a temperature of  $40^{\circ}$  C., yielding an excellent oil.

*Sesam oil* gives an intensely green reaction with a mixture of sulphuric and nitric acids; since no other fat oil shows this reaction, it may be used as a test for the adulteration of other fat oils with sesam oil; if they contain only ten per cent. the reaction is reliable. N. Jahr. Ph. Jan., 1869.

*Bleaching of Palm Oil* by chromic acid. M. Engelhardt suggests the following mode of bleaching palm oil: A convenient quantity of the oil is placed in a cauldron and heated to about  $60^{\circ}$  C., and allowed to repose during twelve hours; it is then poured

into a clean vessel and cooled down to  $40^{\circ}\text{C}$ . Now a solution of fifteen parts potassium bichromate to forty-five parts of water is made, and when still warm sixty parts of chlorhydric acid are added. This liquid is then mixed under vigorous agitation with one thousand parts of the oil. By continued stirring, the oil is colored green and the chromic oxide is completely separated, when the oil becomes clearer, and finally quite limpid. It is now washed with hot water, and is then obtained perfectly white. D. C. Feb. 1869, 38.

*Almond Oil.* Lipowitz has recommended the use of hypochlorite of lime as a means of detecting the adulteration of olive oil and of sweet almond oil with the oil of poppy seed. When eight parts of either of them is rubbed up and shaken with one part of bleaching powder and left at rest, after some four or five hours a layer of clean and limpid oil separates and floats at the top and surface of the mixture, which layer is, if the oils operated upon are pure, at least half the bulk of the original mixture. If, however, poppy oil is mixed with either of the two oils, the mixture has the appearance of a liniment, from which no oil separates. Almond oil, if adulterated with one-eighth part of poppy-seed oil, behaves as if it were almost pure poppy oil. The action of this reagent is explained by the rapid oxidation of all so-called drying oils, which, on drying, yield solid products, by continuously absorbing oxygen, before entirely changing into water and carbonic acid. Ch. N. A. R. March, 1869, 159.

*Cod Liver Oil.* Dr. B. A. Foster, in the Brit. Med. Journ., recommends the addition of some ether to cod-liver oil as improving the therapeutical, as well as the palatable properties of the oil. London Ph. J. Jan., 1869.

*Phosphorated Oil* is best prepared, according to C. Méhu, by first heating sweet almond oil to  $392^{\circ}\text{F}$ . After cooling, it is filtered, and the dried phosphorus is dissolved (one grain to one hundred grains of the oil) at about  $176^{\circ}\text{F}$ . To prevent the phosphorescence of the oil, Méhu suggests the addition of four per cent. ether. Journ. de Chim. et de Ph. No. 7, 1868.

*Olive Oil.* The Comité du Commerce des Alpes Maritimes,

at Nizza, has offered a price for a reliable and simple method for the detection of the adulteration of olive oil. M. Behrens, in Lausanne, thereupon has published a test which he has employed since 1853, and which he avers to answer satisfactorily: Equal parts of the sample, and of a mixture of equal parts of crude sulphuric and hydrochloric acids are slightly shaken. If the color of the oil remains unchanged it was pure; if it contains sesam oil it turns green; if linseed oil, red brown; if sweet almond oil, pink; if rape-seed oil, red-brown; if poppy-seed oil, red. Ph. Zeit. 1869, No. 57.

No. 56 of the Ph. Zeitung, 1869, contains a notice that the above named committee have awarded the prize for the best and simplest mode to test the purity of olive oil to a pharmacist of Alexandria, (Egypt). His method was, however, as yet not made known.

#### VOLATILE OILS.

*J. Frank* has continued his researches on the adulteration of the volatile oils. These elaborate studies are too comprehensive and not well adapted to be given in an abbreviated report. Frank's memoir is given in full in Neues Jahrb. d. Pharm. xxiv. 28. Frank, as will be remembered from former reports, uses the reaction of fuchsin with the oils, as a means for the detection of an alcoholic adulteration, and a polaristobometer for the detection of admixture of cheaper volatile oils.

*Oil of Peppermint.* Among the methods for testing commercial peppermint oil a novel one is given by M. Roze for determining an adulteration with turpentine oil; it consists in blowing a slight current of air through an S shaped glass tube upon the surface of about half an ounce of the sample contained in a wide test tube; if the oil contains more than four per cent. oil of turpentine, above its surface is formed a white striated cloud, probably caused by a hydrate of the oil of turpentine. Journ. de Ph. et de Chim. 4 ser. viii. 125. Hager thinks this reaction reliable, although he found, among the oils which do not explode with iodine, several producing the same reaction. Cent. Halle ix. 296.

Oil of peppermint has recently been found adulterated with the

essential oil of copaiva balsam. In order to detect this, St. Martin suggests to heat a sample carefully with strong nitric acid; when cooled, the oil will have thickened and will be the more resinified the more copaiva oil it contained, while pure peppermint oil remains liquid, only turning dark brown. Zeitsch. d. Oest. Apoth. Ver. 1869.

*Oil of Bitter Almonds.* W. A. Tilden, in Viertlj. S. Ph., calls attention to the fact that essential oil of bitter almonds, when not freed entirely from water, is apt to decompose, whilst oil free of water keeps for any length of time, which is also the case when to the former oil some alcohol is added. Hager's Centr. Halle, 1869, 49.

*Oil of Mustard Seed.* Hager met a sample of essential mustard oil adulterated with castor oil and oil of cloves, and another one with bisulphide of carbon. According to Hager, one drop of the pure oil must render a clear solution with fifty drops pure sulphuric acid, as well as with a mixture of four drops of water and sixteen drops of alcohol. Hager's Centr. H. 1869, Nos. 9 and 12.

*Volatile Oil of Peru Balsam.* M. Kraut found that this oil may be separated by distillation under reduced pressure, and in an atmosphere of carbonic acid gas, into three different oils of various boiling points and composition. Ber. d. Deutsch. Chem. Ges. No. 8., 1869.

#### OINTMENTS AND PLASTERS.

Binert recommends the use of *paraffin* as a *substitute for spermaceti* and *wax* in ointments and pomades. One part to four or six parts of lard are proper proportions. Hager's Cent. H. ix. 115.

The Schweiz. Wochensch. f. Ph. 1867, 379, calls attention to the fact that the ointment of potassium iodide keeps for a long time undecomposed when a trace of sodium hyposulphite has been added to the potassium iodide. This addition is said to be entirely harmless, but has to be omitted when any free iodine has to be added to the ointment.

*Belladonna Plaster.* John Palmer suggests the preparation of this plaster from the extract of belladonna root with soap-



plaster. Three parts of the latter with one part of the former yield an effective and stable plaster. London J. Ph. 1869.

*Burgundy Pitch and Caoutchouc Plaster.* M. Lorigine suggests the combination of 35 parts of caoutchouc, cut in thin pieces and reduced to a semifluid consistence, with 13 parts of petroleum in a close vessel, with 300 parts of Burgundy pitch and 25 of white wax, previously melted and gradually admixed. Finally, three parts of glycerin are added. Journ. de Ph. et de Ch., Feb. 1869.

*Carbolic Acid Plaster.* Jos. Hirsh, in the Chicago Pharm., suggests the carbolate of glycerin, which, with isinglass, forms an even mixture, capable of being spread upon cloth, tissue paper, etc.

Thos. E. Jenkins suggests, as a plastic agent for the application of carbolic acid in surgical dressings, a glazier's putty, prepared by well kneading 47 parts of prepared chalk with 17 parts of a mixture of 4 parts glycerin and 1 part carbolic acid. A. J. Ph., July, 1869, 292.

W. Martindale, recommends the following carbolic acid plaster:—9 parts shellac are heated with 1 part crystallized carbolic acid till the shellac is melted; then 2 parts acid are added and thoroughly mixed, strained and spread to the thickness of about one-fiftieth of an inch. The surface of the plaster is then lightly brushed over with a solution of gutta-percha in 30 parts of its weight bisulphide of carbon. London Ph. J., Jan. 1869, 391.

#### PILLS.

*Pill Machine.* M. Bushby has constructed a simple machine for manufacturing pills, consisting of two rollers, fitted with adjusting screws, which form the pill-mass into sheets of the desired thickness. The sheet then passes into a self-acting feeding apparatus, bringing it under the edge of a knife which cuts off a bar and carries it between semi-circular grooves, which, revolving rapidly, cut and form it into pills; another instantly follows, the shower of pills being continuous as long as the sheet is supplied. About 1000 pills per minute may be made by the machine; it can, however, be made capable of making far greater quantities if required. London Chemist and Drug., Nov. 14, 1868. Am. J. Ph. Jan., 1869, 63.

(In recommending this useful contrivance, the Editor of a British Pharmaceutical Periodical thinks the following suggestions congruent with the enlightened views of modern pharmacy: "we are inclined to think that a little mysterious machinery about a chemist's shop, often adds to his reputation as a scientific man, and helps to maintain the dignity of the profession.")

Thos. E. Jenkins, in Am. J. Ph., March, 1869, 119, recommends *glycerin as an excipient for pills*.

*Calomel in Pills.* It is well known that mercurous chloride, when in continuous contact with many organic substances, suffers a gradual decomposition into the mercuric chloride and metal. In most pills containing calomel the conditions are present which favor such a decomposition. Practitioners as well as pharmacutists should bear this fact in mind, since such pills, when ready kept or even recently compounded, are liable to produce very serious consequences. Hager's Centr. Halle, 1869, No. 6.

#### POWDERS.

*Myrrh.* M. Rode calls attention to the fact that myrrh should not be dried by warmth, since it loses a good deal of its essential oil. Myrrh, like other gum-resins, can readily be powdered during the cold season. N. Jahrb. d. Ph. xxx, 202.

*Rhubarb.* Opwyrdá met with commercial powdered rhubarb adulterated with turmeric. In order to find out such a fraud, the powder is triturated in a mortar with some watery solution of boracic acid; pure rhubarb remains unchanged, whilst, when containing turmeric, it turns reddish-brown after a few minutes when containing 10 per cent. or more turmeric, or more gradually when it contains less. Journ. de Ph. d'Anvers, xxiv, 324.

(Drugs like opium, ipecac, jalap, rhubarb, scammony, etc., upon the goodness of which so often depends the weal and frequently the life of our fellow men, ought not be bought powdered. Unhappily many pharmacists are only dispensers, or, are by the circumstances, hindered in preparing the usual pharmaceutical preparations; but such important drugs, at least, should be powdered by each who deliberately shares the great responsibility which rests upon the dispensing pharmacist.)

*Liquorice Extract.* The Journ. de Pharm. d'Anvers calls attention to the fact that, in France, black liquorice powder has lately been found considerably admixed with charcoal powder, evidently not by the manufacturer, but by druggists. They rely upon the excuse that the extract, when dried, has been somewhat charred by overheating. Ph. Zeit. 1869, No. 7.

*Hydrargyrum cum Creta.* J. P. Remington examined eight samples of American and one of English manufacture. The relative quantities of the mercurous and mercuric oxides contained therein were so much at variance, that the disfavor with which this preparation has met lately is not groundless. Proc. Am. Ph. Ass. 1868, 379.

(Mercurial and similar important galenic medicines should be as much as possible of stable and constant composition, and preparations of any uncertainty with respect to their composition or strength, and subjected to accidental changes, as is the case with hydrargyrum cum creta and with blue mass, had better be discarded from our Pharmacopœia.)

#### SOAPS.

*Manufacture of Soaps.* It is a well known fact that, by an indirect process, a potassa soap may be converted into a soda soap; this is done by adding to a boiling solution of potassa soap a very strong solution of sodium chloride; and it is generally taken for granted that, if enough of the latter has been added, the potassa soap is converted, at least chiefly, into soda soap, while potassium chloride is formed. Dr. Oudemans ascertained how much of the potassa is substituted by soda. The results of his researches are principally these:—By the process as executed on the large scale, and yielding excellent products, only a little more than half = 53·7 per cent., of potassa is replaced by soda, while 46·3 per cent. of potassa are left along with the other alkali combined with fatty acids in the crude soap. Journ. f. pract. Chem. 1869, No. 1.

*Estimation of the quality of Soap.* Prof. Schultze, of Rostock, starting from the view, the better the soap the less thereof will be required for the entire unhardening of water, employs the reverse of Clark's process, in the following man-

ner:—He prepares a solution of lime in water containing excess of carbonic acid, so that a litre of water contains exactly 1·6 grms. of lime. Of this fluid he takes 3 c.c. (containing accordingly 4·8 milligrms. of lime,) and adds 20 c.c. of water, and a small quantity of soda solution; he further applies an aqueous solution of 5 grms. of soft soap in 100 c.c., or of the same quantity of solid soap in 200 cc. of water, and adds of these solutions from a burette to the afore-said lime solution until a lather is completely formed. The smaller the quantity of soap solution required for this purpose the better, of course, the soap is, and it is easy to calculate how much of the soap solution has been required for one part, by weight of lime. A perfectly pure soap, however, will be required, for comparison's sake.

#### SALTS.

The so-called granular citrate of magnesia contains, according to F. C. Clayton, not always citric acid as shown by the analyses of several chemists. The author gives, in the London Ph. J., Oct. 6, 1868, 195, a formula and mode of preparation.

#### SPIRITS.

*Sweet Spirit of Nitre.* J. W. Mill recommends the preparation of sweet spirit of nitre as well as other pharmaceutical preparations. He describes an apparatus and the following process:—13 fluid oz. alcohol of at least ·835 sp. gr., and 3 fl. oz. nitric acid, sp. gr. 1·42, are introduced into a generating bottle, as described by the author, with a little clean sand; when the apparatus is properly adjusted, heat is applied. As soon as the reaction begins, the water bath is withdrawn and the reaction is allowed to proceed spontaneously. During the process 3 fl. oz. nitric acid are added through the safety tube in small portions, so as to maintain the reaction in moderate activity. The resulting distillate (about 10 fl. oz.) is shaken with half oz. potassium carbonate, and then with twice its volume of water. After depositing, the mixture is separated by means of a separating funnel; the supernatant spirit (about 5 fl. oz.) when properly collected, is mixed with enough alcohol to make the mixture measure 100 fl. oz., or to such a point that the product will answer

in ethereal strength to that prescribed by the U. S. Pharmacopœia. Chicago Pharmacist, Sept. 1868.

*Detection of Methylic Alcohol.* Since the test of H. N. Draper, for the detection of small quantities of methylic alcohol in sweet spirit of nitre is not reliable, John T. Miller employs the oxidation test after treating the sample in the following manner:—About 1 oz. of the sample is shaken with 20 or 30 grains of anhydrous potassium carbonate, or so much as is dissolved, then pour off the supernatant spirit. This serves to neutralize acid and remove water. Introduce half a fluid-ounce of the spirit into a small flask; add 150 grains of anhydrous calcium chloride in powder and stir; then, having connected the flask with a condenser, place it in a water bath, and distil a fluid-drachm and a half. The distillate contains nearly the whole of the nitrous ether and other interfering substances. Now add to the contents of the flask a fluid-drachm of water, and draw over the half drachm of spirit required for testing. Add to it the usual oxidizing solution composed of 30 grains of red potassium bichromate, 25 drops of strong sulphuric acid, and half an ounce of water; let the mixture stand and distill half a fluid oz. Treat the distillate with a slight excess of sodium carbonate, boil it down to 2 fl. drachms and drop in cautiously enough acetic acid to impart a faint acid reaction; pour the liquor in a test-tube, add two drops of diluted acetic acid and one grain of argentic nitrate in half a drachm of water; then boil gently for about two minutes. If the spirit is free from methylic alcohol the solution darkens, and often assumes transiently a purplish tinge, but continues quite translucent, and the test-tube, after being rinsed out and filled with water, appears clean. But if the spirit contains only one per cent. of methylic alcohol the liquid turns first brown, then almost black and opaque, and a film of silver is deposited in the tube. When the sample is methylated to the extent of 3 or 4 per cent., the film forms a brilliant mirror. London J. Ph., Feb. 1869, 465.

#### SUPPOSITORIES.

J. B. Moore, in continuation of his valuable contributions to the preparation of suppositoria, suggests, as the best mode of



preparing assafoetida suppositoria, to rub the assafoetida, previously purified by solution in alcohol with some liquor potassæ, (7 drops to each drachm) until well mixed, and then gradually add the oil of cacao. A. J. Ph., Sept. 1868.

#### SYRUPS.

The objectionable property of several pharmaceutical syrups to deposit sugar in crystals is obviated by the addition of about 1 per cent. of glycerin, according to a communication to Schweiz. Wochensch. f. Ph., 1868, p. 89.

*Fruit Syrups.* Hager suggests the following test for ascertaining if fruit syrups are colored with aniline dyes:—Add a solution of sodium hydrate in excess, and shake with an equal volume of ether. Decant the ethereal mixture, mix with one-third its volume of water, and add a few drops acetic acid. If the syrup is colored with fuchsin the watery layer is colored more or less, while when the syrup is genuine neither of the layers assumes any color. Hager's Cent. Halle. 1868.

*Syrup of Lactucarium.* P. W. Bedford suggests for the preparation of this syrup the same formula as given for syrup of tolu in the U. S. Pharmacopœia of 1860, with a slight modification. Its resulting syrup has a dark transparent appearance. Proc. A. Ph. Ass. 1868, 400.

*Syrup of Ferrous Iodide.* I. Hugès, after a series of experiments, avers syr. ferri iodidi, and all syrups containing iron, undergo no gradual decomposition and change when they are made thicker than usual, when they are kept at a moderate temperature and not corked, but in bottles capped with vegetable parchment. Lond. J. Ph., Nov. 1868, 320.

I. H. Holloway, however, in a communication to the same Journal, Dec. 1868, 365, thinks these recommendations of questionable value, and suggests, in order to prevent oxidation or to restore its original state, to expose it frequently to the sunlight.

M. Jeannel, in the Journ. de Pharm. et de Chim., Nov. 1868, recommends for the same purpose the addition of a small quantity of tartaric acid.

*Syrup of Tar.* J. B. Moore recommends the following formula for tar syrup:—1 oz. tar, 1 oz. sugar and 3 oz. mag-

nesium carbonate are gradually reduced to a pulverulent mixture; this is triturated with 4 oz. of a mixture of 2 oz. alcohol and 6 oz. water. After straining and pressing, the residue is again triturated, first with 1 oz. sugar and then with the remaining menstruum. After again straining and pressing, the dregs are triturated and packed in a glass-funnel prepared for percolation; then the liquids obtained are first allowed to pass through the percolator, and afterwards so much water as will be required to make the whole, after addition of 10 oz. sugar, one fluid pint. A. J. Ph., Jan. 1869, 6.

*Syrup of Violets.* In the Journ. de Chim. et de Ph. 1869, the following formula for preparing the syrup from the dried violet flowers is recommended:—In  $3\frac{1}{2}$  oz. infusion from half drachm of violet flowers and a slight trace of citric acid sufficient sugar is dissolved to make a syrup.

*Aniline Dyes for Coloring Syrups.* Recently the use of these colors, which frequently contain arsenic acids or other poisonous admixtures for dyeing syrups, has been cautioned.

#### TINCTURES.

*Specific Gravity.* W. Laird, in a paper read before the Norwich meeting of the Brit. Ph. Conf., calls attention to the specific gravity of the tinctures, and gives the specific gravity of some of the much employed tinctures of the British Pharmacopœia.

(The Prussian Pharmacopœia contains a schedule giving the exact specific gravity of all the most important tinctures, liquors, spirits, of ether and chloroform at all the degrees of the thermometer during the seasons of the year.)

*Tinctures by Percolation.* R. M. Atkinson read before the Leed's Chemist's Association a paper on tinctures and their preparation by percolation. He stated that the variation in the specific gravity of properly made tinctures is but slight. For tincture of conium, digitalis and similar ones, Mr. Atkinson recommended the use of bottles of non-actinic glass, since he thinks them acted upon by light. Mr. Atkinson's laborious report is accompanied by a table, giving the amount of alcohol required for each pint of tincture, with specific gravity, weight of solids

ordered by the Brit. Pharmacop., weight of marc pressed, and weight of marc dried. London Ph. J., March 1869, 529.

*Tinctura Iodi Decolorata.* Chas. O. Curtman suggests, for the preparation of a colorless substitute for the official alcoholic solution of iodine, a preparation obtained by the following process:—The solution of iodine is decolorized by the addition of a surplus of ammonia and afterwards by a careful addition of as much hydrochloric acid as to leave the solution but feebly alkaline. The ammonium chloride is nearly insoluble, and deposits, whilst the ammonium iodide and the iodate remain in solution. A. J. Ph., July 1869, 345.

(It might be questionable, at least, if such a solution of iodine salts can be considered, in a therapeutical respect, equivalent to a solution of iodine; for the chemist it is entirely different.)

#### WINES.

*Test for Wines.* Facen recommends, as a reliable test for the genuineness of wines, the shaking of a sample with its equal weight of powdered manganic oxide. If after a quarter of an hour the filtrate is bright and discolored, the color of the wine was natural, whilst artificially colored wines remain more or less colored. Hager's Cent. Halle, ix, 213.

(Wittstein contradicts the reliability of this test. Viertelj. Sch. f. Ph. xviii, 241.)

A. Phillips states that sesquichloride of iron imparts to the juice of black cherries, huckleberries and mallows a violet color with a reddish or bluish tint. Pure red wine is colored red brown. The amount of free acid in the wine influences the shade of the color. The bluish gray color imparted by artificially colored wines, according to Böttger, to sponges previously treated with muriatic acid, is probably due to their retaining a trace of ferric chloride. Ber. d. Deut. Chem. Ges. 1, 81.

*Wine of Colchicum.* James T. King examined a sample of English colchicum wine, and failed to find any colchicin in it. Am J. Ph., Nov. 1868, 508.

(Wine of colchicum and similar preparations of such an importance to the practitioner, should be made from drugs of unobjectionable quality by the pharmacist, and should not be

bought, at least not unless the dispenser can be fully satisfied as to the quality and strength of the drug, and accordingly of the preparation.)

#### MISCELLANEOUS.

*Mustard paper.* Since Rigollot has introduced the mustard paper, it has met with success, and has been the subject of several communications to the pharmaceutical periodicals. It is prepared by fixing upon the paper finely powdered mustard seed, previously freed from its fat oil by bisulphide of carbon.

*A paper known as Cooper's Engl. Mustard Paper* is, according to Hager, (Centralh. 1869, No. 11,) a paper only saturated with a concentrated tincture of euphorbium and capsicum.

*Litmus Paper.* Since sized litmus paper is more delicate than unsized, A. Varhu suggests the use of a paper sized with isinglass solution. W. Casselmann, finds most note-paper answering the purpose. Zeitsch. f. anal. Chem. vii, 466.

*Marking Ink.* The tissue, linen or cotton to be marked are moistened with a solution of one part of hypophosphite of soda and two parts of gum arabic in 16 parts of water. The marking is then done with a quill-pen and a solution of one part argentic nitrate, six p. gum and six p. water. Cosmos. No. 23, 1869.

One drachm of aniline black is rubbed up with 60 drops strong hydrochloric acid and  $1\frac{1}{2}$  oz. alcohol. The resulting liquid is then to be diluted with a hot solution of  $1\frac{1}{2}$  drachms of gum arabic in six oz. water. This ink does not corrode metallic pens, is affected neither by concentrated mineral acids nor by strong lye. If the aniline black solution be diluted with a solution of  $1\frac{1}{2}$  oz. shellac in 6 oz. of alcohol, instead of with gum water, an ink is obtained which, when applied to wood, brass, or leather, is remarkable for its extraordinary deep black color. American Artisan.

*Ink for writing on Glass.* A solution of fluoride of ammonium is recommended as furnishing a ready means of writing with a pen of any kind upon glass, and is especially adapted for labelling bottles, etc. Amer. Artisan.

*Liquid Glue.* M. Knaffl recommends, in Wochensch. d. oest.

Gewerb. Ver., the following liquid glue:—three p. of glue broken into small pieces are covered with eight parts of water, and left to stand for some hours; half p. of hydrochloric acid and three-fourths p. of zinc-sulphide are then added, and the whole exposed to a temperature of from 81° to 89° C., during ten or twelve hours.

*Cements.* An acid proof cement for protecting corks from the destructive action of vapors is suggested by F. R. Fairthorne. The corks are first soaked for some hours in a solution of sodium silicate, consisting of one p. commercial concentrated solution to three parts of water. Then, before use, the corks are covered with a putty made from powdered glass with a concentrated solution of water glass, and are afterwards washed with a solution of calcium chloride. Journ. Franklin Inst., April, 1869.

*Hard and unyielding Cements*, resisting red heat as well as boiling water, are obtained by mixing 4 to 5 parts dry clay, 2 p. iron-filings, 1 p. manganic peroxide, half of rock salt, half of borax, and the necessary quantity of water. The cement has to be applied immediately. Blätter für Hand. u. Gewerbe.

Equal parts of sifted manganic peroxide and zinc-white, mixed with enough soluble glass to form a thin paste, yield a good cement. Ch. N. A. R., Nov. 1868, 252.

*Cement for Metals and Stone.* M. Pollack recommends a mixture of litharge and glycerin. Ch. N. A. R., Aug. 1869, 95.

*Lucifer Matches.* H. Fleck, after a series of experiments, suggests the substitution of sodium for phosphorus, since minutely divided sodium becomes inflammable in contact with explosive substances when moistened. The sodium is reduced to powder by wetting and shaking in paraffin; it is then mixed with the following substances, which are each triturated previously with some petroleum:—4·65 per cent. sodium, 61·39 per cent. potassium nitrate, and 33·96 per cent. antimonious sulphide. The mixture is made up to a paste, previously soaked in petroleum. A. J. Ph., Mai, 1869, 257.

*Silvering Glass.* Browning's excellent process for silvering glass is reprinted in the March number of the Ch. N. A. R., 159.



*Silvering Cast-Iron.* M. Böttger recommends the use of a bath prepared by dissolving 15 grms. argentic nitrate in 250 grms. of water, and adding 30 grms. of potassium-cyanide; this solution is then poured into 750 grms. of water, wherein 15 grms. of common salt have been previously dissolved. The cast-iron intended to be silvered by this solution should, after having been cleaned, be placed for a few minutes in a bath of nitric acid of 1.2 sp. grav. just previous to being placed in the silvering fluid. *Monit. Scientif.* 1869, No. 298.

*Tinfoil*, having a crystalline surface, and coated with a transparent varnish or with gelatine of various colors, has recently come into large demand. Pusher, of Nüremberg, publishes his process of getting the crystalline surface on the tin. It is done with a solution of 2 parts of tinchloride in 4 parts of hot water, 2 parts hydrochloric acid, 1 part nitric acid. The tinfoil is dipped into this mixture and left until the crystals appear. Small crystals are obtained when the solution is applied cold, larger ones when used hot. The most beautiful specimens of this manufacture are coated with varnishes colored with aniline dyes.

*Coloring matter of Wafers.* Dr. Furtenbach examined samples of wafers in order to determine their coloring matter. Bright red colored wafers left, on incineration, an ash consisting of plumbic tetra-oxide, barium sulphate and some plumbic sulphate; another sample of bright red color was free of barium sulphate but contained 46.9 per cent. plumbic tetra-oxide. White wafers were colored with barium sulphate, blue ones partly with ultramarine, partly with Prussian blue, but contained in all instances besides these, barium sulphate and in some samples white lead. Pink colored wafers contain carmine lake, alumina being found in the ash; brown colored wafers are tinged with iron ochre; violet wafers were found to be colored with some lac-dye, containing alumina; black ones partly with lamp black partly with harmalin black, which, on incineration, left ferric oxide; green ones are colored with so-called green cinnabar (chromate of lead and Berlin blue mixed,) also with copper and arsenious compounds. *Ch. N. A. R. Aug.*, 1869, 94, from Bayer. Ind. & Gewerb. bl. No. 2, 1869.

*Origin of Infusoria.* Prof. Bennet, in a lecture on the atmospheric germ theory and origin of infusoria, stated the conclusions to which he had been led by observations conducted by him for a number of years and which have also an interest for pharmacy. He considers that the infusoria, vegetable and animal, which we find in organic fluids during fermentation and putrefaction, originate in oleo-albuminous particles, which are formed in the fluids, and which, floating on the surface, constitute the primordial mucous layer of Burdach, the proligerous pellicle of Pouchet. There under the influence of conditions, such as temperature, light, air, chemical exchanges, etc., the lower forms of vegetable and animal life are called into existence. Prof. Bennet has also performed numerous experiments, with a view to determine whether or not it be possible to prevent the rise and development of infusoria in a fluid by means calculated to destroy germs; but they have convinced him that, although means be used sufficient to destroy germs in an infusion and in the air in contact with it, infusoria are developed notwithstanding. Edinb. Med. Journ. & Dental Cosmos. April, 1869, 212.

#### SECRET MEDICINES.

In Germany, where the sale of secret medicines is prohibited, or at least restricted to a considerable degree, the nuisance of this illicit traffic is effectually met by analysing all such nostrums, and publishing their composition and their real cost price. Referring to Mr. Robbins' striking disclosures on this important subject in his last year's report on the drug market, and considering the increasing importance of this disgrace to American pharmacy, I leave it to the judgment of the members of this Association if the same practice would not work in our country just as effectually, and be, perhaps, the best legitimate means of baffling this growing degeneration of the medicinal trade.

*Holloway's Pills.* Aloe 40 p., rhubarb 20 p., cassia 5 p., cardamom 5 p., ginger 20 p., crocus  $2\frac{1}{2}$  p., Glauber's salt 5 p., potassium sulphate 10 p., conserva rosarum 20 p., water q. s. for 1000 pills. Centr. Halle. No. 5. 1869.

*Holloway's Ointment.* Yellow wax 20 parts, resina pini alba

25 parts, lard 50 p., olive oil 75 parts. Centr. Halle. No. 5, 1869.

*Injection vegetale au Matico par Grimault & Co., Paris.* Each bottle contains 4 grains cupric acetate and  $4\frac{1}{2}$  oz. matico water. Centralhalle ix, 124.

*Papier épispastique supérieur d'Abespeyres* is a paper coated with the following mixture: Croton oil 1 part, Japan wax 2 parts. Centralhalle No. 24, 1869.

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## PHARMACOGNOSY.

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### DRUGS DERIVED FROM THE VEGETABLE KINGDOM.

#### LICHENES.

*Roccella tinctoria*, Ach. J. Stenhouse publishes an interesting report on his researches on some varieties of *Roccella tinctoria*. It contains an improved method for the estimation of the quantity of coloring matter contained in these and similar kinds of lichens. For this purpose, 100 grains of the lichens are to be digested with a dilute solution of caustic soda, which operation is to be repeated. The fluid so obtained is filtered; after filtration it is treated with a solution of hypochlorite of soda of known strength, the addition of which produces a blood-red coloration of the fluid, and this continues as long as any coloring matter is left. From the quantity of the soda solution used the quantity of coloring matter may be inferred. Ann. Ch. & Ph. March, 1869, 296.

#### FUNGI.

*Claviceps purpurea*, Tulasne. Mr. Romans, in a communication to the Brit. Pharm. Soc., calls attention to the fact that ergot is so rich in sulphate of potassa as to give slight crystallizations when the watery extractions have been evaporated, and then are mixed with alcohol and red oxide. Ph. J. March, 1869, 513.

H. Höhn prepared from the fatty oil expressed from ergot, cholesterin, as yet only found as a product of animal organization, in the bile, the brain, the blood, and in the biliary calculi. Arch. Ph. Jan., 1869.

Berlandt (Arch. Ph. 182, 282) states that the usual methods to determine the presence of ergot in rye or wheat flour are insufficient for forensic cases. They depend, as well known, mostly upon the evidence of the formation of propylamin, which is recognized by its characteristic odor. Berlandt thinks it necessary to verify this reaction by a chemical proof also, and suggests a method which is based upon the known decomposition of propylamin at a high temperature into methane (marsh gas) and hydrocyanic acid.

## ALGÆ.

*Chondrus crispus*, Stackh., Grev. According to the "Amer. Exchange and Review," Irish moss has been used for some time as a substitute for glue, isinglass, albumen, etc., for sizing paper, cotton, cloth, etc., and for clarifying and other purposes in arts and trades. Am. J. Ph. March, 1869, 128.

The difficulty of freeing some vegetable mucilaginous substances from nitrogenous and inorganic admixtures is well known. In order to effect this, a repeated precipitation is required. M. Blondeau published in the J. de Ph. & Ch. xv, 37, the results of his researches on the jelly of Irish moss, and attributed to it the following composition:

C,	.	.	.	.	21.80
H,	.	.	.	.	4.87
N,	.	.	.	.	21.36
S,	.	.	.	.	2.51
O,	.	.	.	.	49.46
					<hr/>
					100.00

Since this pretended formula has found its way into several journals, it is proper to compare it with the researches of Flückiger and Obermaier (N. Rep. Ph. xvii, 348), which coincide with the former researches of Marchand (Ann. de Ch. & de Phys. viii, 321), and which give the percentage of nitrogen and ashes for similar algæ also:

Laminaria digitata. Lam. saccharina. Fucus serratus. Fuc. siliculosus.				
N,	1.07	1.75	1.25	1.80
Ashes,	17.82	13.85	18.46	11.38
Fucus vesiculosus.				
N,	.	.	1.22	
Ashes,	.	.	15.09	

*Chondrus crispus* contains, according to Flückiger and Obermaier :

N, . . . . .	1.012
Ashes, . . . . .	15.06

According to the same authorities, *Chondrus crispus* contains some per cent. sulphates, but not any other sulphur compound.

Flückiger and Obermaier prepared the mucilage of the Irish moss in as pure a state as possible ; it forms a light yellow powder ; in water it swells up considerably, and dissolves in a sufficient quantity to a clear liquid which does not change litmus paper.

The mucilage of *Chondrus crispus* differs in its deportment to the usual reagents essentially from arabin, starch, cellulose, and the similar hydrocarbons ; it seems to come nearest to the mucilage of the marshmallow root. N. Rep. Ph. xvii, 348.

#### MELANTHACEÆ.

*Veratrum viride et album.* Oulmont examined the physiological effects of both, and found that the latter is distinguished by greater violence upon the digestive system, and by greater rapidity of action. He also examined the action of veratria, with the result that it appears not to be the only active principle, since *Veratrum viride* deprived of the alkaloid and administered to animals, had the same therapeutical effect as the natural drug. N. Rep. Ph. xvii, 177. A. D. C. Oct. 68, 279.

#### ASPARAGEÆ.

*Convallaria majalis*, L. Dr. Marmée describes two glucosides obtained from the mayflower : convallarin and convallamarin. The former is but little soluble in water ; the latter more freely. They cause vomiting when taken internally in small doses ; in larger ones they seem to be energetic heart-poisons, producing paralysis of the heart. Am. J. Med. Sci. April, 1869, 501.

#### SCITAMINEÆ.

*Maranta arundinacea*, L. This indigene of Surinam has successfully been cultivated, as is well known, on the Bermudas and West India Islands ; for some years it has also been cultivated by German settlers in Dona Franciska, Blumenau, and other Ger-



man settlements in Brazil. This Brazilian Maranta starch is equal to the best of the Bermudas or of St. Vincent, and is not to be confounded with the "Brazilian arrow-root," which is the starch of *Manihot utilissima* and *Manihot Aipi*, Pohl, which frequently are met with in commerce as Maranta arrow-root, from which, however, they essentially differ. These two plants of the Euphorbiaceæ are extensively cultivated in South America. A practised eye and the microscope are the best means of ascertaining the origin of the arrow-root-starch. In the European market there occurs sometimes an arrow-root which is a mixture of the starch of Maranta and of the Manihots, and of *Curcuma leucorrhiza*, Roxb. J. p. Ch. 105, 121. Arch. Ph. 184, 257.

#### IRIDEÆ.

*Crocus sativus*, L. Weiss has instituted a series of rescarches on the stigmas of saffron which have resulted in important information on this interesting drug. Its red coloring principle, formerly called polychroit, and since 1862, by Rochleder, crocin, is, according to Weiss, a glucoside which has as yet not been obtained pure. Acted upon by acids it splits into glucose, into an essential oil, and into a new coloring principle. The slight traces of oil and sugar contained in the stigmas have probably their rise in the ready decomposition of the glucoside. For the same reason, all attempts to obtain this substance pure have as yet failed. Weiss retains the old name of polychroit for the glucoside, and transfers the name crocin to the coloring matter produced by its splitting. J. p. Ch. 101, 65.

An ingenious *adulteration of saffron* in France has been brought to light, by Caroz, in the Journ. de Ch. Méd. 5 ser. iv. 202, which perhaps may be worth pointing out to druggists and pharmacists. The young shootlings of a carex, probably of carex pulcaris, or carex capillaris, are dried, and then impregnated with tincture of saffron, in addition, perhaps, with some sugar, honey, or glycerin. They are then mixed with the saffron used for making the tincture, and are brought into commerce. Such an article has even been at the late Paris exhibition, and was bona fide bought by French druggists. The adulteration is easily detected by a practiced eye, and very distinctly by the microscope.

## CUPULIFERÆ.

*Quercus*. W. Smith examined the galls produced upon oaks in England, and found that they contained 26·71 per cent. gallo-tannic acid, against 61·65, the per centage of Aleppo galls. Ch. N. A. R. Mai. 1869, 251.

## EUPHORBIACEÆ.

*Euphorbia resinifera*, Berg. The gum-resin of the euphorbia species has been the subject of elaborate examination by Flückiger, with the following result in respect to its composition :

Euphorbon . . .	22·0	Chloride of Sodium	1·2
Neutral Resin . .	38·0	Potassa.	} traces.
Bassorin . . .	18·4	Magnesia.	
Malonate of Lime	9·9	Phosphoric Acid.	
Malonate of Soda	2·5	Silicic Acid.	

Flückiger did not find arabin, cerin, myricin, caoutchouc, essential oil and other substances, mentioned in former analyses. Euphorbon was especially the subject of examination. It is colorless and odorless, insoluble in water, slightly soluble in diluted, but freely in strong and in warm alcohol. Ether, benzin, amyl-alcohol, chloroform, acetone and glacial acetic acid dissolve it freely. Its composition is represented by the formula  $C_{26}H_{44}O_2$ . Wittst. Viert. Jahr. Ph. xvii. 82, 102.

*Siphonia elastica*, L. Caoutchouc, as well known, has a peculiar odor, obnoxious to many persons, which is stronger when warm. Müller states that caoutchouc and articles made thereof can be completely deprived of this smell when they are packed in boneblack, protected by wood or wrapped in paper and carefully warmed for some time. Zeitsch. d. oest. A. Ver. vi. 392.

*Mercurialis annua and perennis*, L. In 1863 E. Reichard discovered in these plants the volatile alkaloid mercurialin. After continued studies on this substance, Reichard arrived at the interesting result that mercurialin seems to be isomeric with methylamin= $CH_5N$ , although they differ somewhat in their properties. Reichard gives, in the Journ. p. Ch. Civ. 301, the concise mode of the preparation of mercurialin and a number of its salts, and describes their properties.

## POLYGONEÆ.

*Rheum*. Dr. E. R. Squibb read before the Philadelphia meeting of the Am. Ph. Ass. a critical review on the present unsatisfactory supply of rhubarb in the American market. Proceed. 1868, 452.

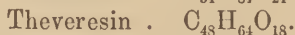
In France *powdered rhubarb root* has been found *adulterated* with turmeric. When such a powder is triturated in a mortar with an alcoholic solution of boracic acid, it becomes red-brown immediately when containing more than ten per cent. turmeric; when less, the change occurs more gradually. Rhubarb powder does not change its color with the solution. Journ. de Pharm. d'Anvers. xxiv, 324.

## FRAXINEÆ.

*Fraxinus ornus*, L. M. Buignet states, in the Journ. d. Ph. et. d. Ch. 4 ser. vii. 401, that manna canellata contains twenty per cent. dextrin, and that the commercial kinds of manna are still richer; the proportion of dextrin to sugar is as 2:1, and is the same as dextrin and sugar occur in the transformation of starch. Buignet concludes that both have their origin from the starch formed in the living plant.

## APOCYNEÆ.

*Thevetia neriifolia*. The bark and the seeds of this tree, indigenous in the West Indies, New Granada and Peru, are considered a powerful febrifuge. The bark seems, as yet, not to have been examined. The seeds contain, according to DeVry, nearly seventy-five per cent. of an almost colorless fixed oil, and besides a crystallizable glucoside—thevetine—which, when acted upon by luted acids splits into glucose, and a resinous substance called theveresin. Both are, according to the experiments of M. Blas, powerful poisons, and are represented by the following formulæ:



Journ. de Ph. & Ch. Mai. 1869.

*Strychnos nux vomica*, Willd. In order to determine the presence of strychnia in nux vomica, or the beans of Saint Ignatius, a piece of the sample is soaked in aqua ammoniæ and then

dried at a moderate temperature. If the piece is then dipped into some amyl-alcohol in a test tube and warmed, a few drops of the liquid, when evaporated on warm porcelain, yield with sulphuric acid and bichromate of potassa the known beautiful reaction of strychnia. Ph. Centralh. 1869, No. 15.

## SOLANÆÆ.

*Atropa belladonna*, L. Dr. D. W. Horment avers that a solution of two drachms extract of belladonna in a fluid ounce of water, applied over the breast with a brush, will stop the secretion of milk, and that its application to one breast will suspend its secretory action without affecting the other. Med. Record, Oct. 1, New York.

*Cyphomandra betacea*. The fruits of this plant, indigenous in Mexico, but cultivated in gardens in Italy, are found to be rich in citric acid. Ch. N. A. R. 1869, 161.

## CONVOLVULACEÆ.

*Convolvulus scammonia*, L. H. S. Evans has examined twenty-three samples of commercial scammony on their percentage of resin soluble in ether. He found it ranging from  $59\frac{1}{2}$  to  $96\frac{1}{2}$  in so-called virgin scammony, and from  $47\frac{1}{2}$  to  $11\frac{1}{4}$  in Aleppo and low scammony. Samples of powdered scammony yielded from  $72\frac{1}{2}$  to  $18\frac{1}{4}$  per cent. of resin. This resin has as yet not been submitted to further examination. Inasmuch as it is considered to be the effectual constituent of the drug, and consequently a standard for its quality, Evans' statements are a new evidence of the uncertainty of this drug, which has brought it into disfavor. Evans therefore recommends the preparation of the resin as a definite preparation. Proc. Brit. Ph. Confer. 1868, 64.

## LABIATÆ.

*Mentha piperita*, L. M. Roze, in a pamphlet—"La menthe poirée, sa culture en France, ses produits, etc. Paris, 1868,"—has published a comprehensive and very instructive essay on the whole subject of the culture of the peppermint plant, which may prove of good service to the peppermint growers in the United States.

## SCROPHULARINÆ.

*Digitalis purpurea*, L. S. P. Duffield examined three samples of this drug, and found that :

1000 parts of the English yielded 9·08 parts digitalin ;

1000 parts of the German yielded 8·07 parts digitalin ;

1000 parts of the American yielded 9·30 parts digitalin.

The English and the German were the leaves only, while the American specimen was from the Shakers of Mt. Lebanon, containing, in their usual style, leaves and stalks. Proceedings, 1868, 413.

## ERICACEÆ.

*Ledum palustre*, L. J. Trapp prepared large quantities of the essential oil of the leaves and flowers of *Ledum palustre*. It forms a crystallized mass like congealed oil of anise, and consists of about equal parts of elæopten and a solid stearopten, which, when purified by recrystallization from its hot alcoholic solution, forms white shining needles of great beauty. When acted upon by sulphuric acid they assume a red-brown color ; nitric acid does not color them, but in addition with one drop of sulphuric acid produces a fine purple color ; fuming nitric acid brings on this reaction immediately. When one drop ferric chloride liquor and a few drops sulphuric acid are added to a solution of the stearopten in chloroform, a beautiful red reaction ensues ; in contact with the air this color gradually changes to green, and at last to brown. Ph. Zeitsch. f. Russl. Sept., 1868.

## RUBIACEÆ.

*Cinchonas.*

*Culture of Cinchonas in East India.* On this important subject Daniel Hanbury, in his opening address to the Norwich meeting of the British Pharmaceutical Conference, made the following statements: The Hollanders have first endeavored to transplant and cultivate the Cinchonas in the East India colonies. To their experiments, failures, and errors, the present success of this important culture is partly due. The first successful attempt was made in 1852 in Java ; the plantations prospered, and were considerably extended in 1854, when the British Government took the matter actively in hand. At present the chief planta-



tions in British India are those on the Neilgherry Hills, near Madras, the most elevated mountain range in India southward of the Himalaya. It appears that in May, 1866, the number of Cinchona plants in the government plantations in this locality was 1,233,645, of which nearly 300,000 belonged to the species yielding red bark, 758,000 to that affording pale or crown bark, and 37,000 to *Cinchona calisaya*. This, however, indicates by no means the full extent of Cinchona culture on the Neilgherries, since there were in addition considerable plantations belonging to private individuals. From Mr. Broughton's report, published in April, 1867, it appears that the number of plants of the red bark in the government plantations in that locality was at that date 800,000, which is an enormous increase within but one year. Other plantations have been formed in Wynaad, Coorg, on the Pulney Hills, and in Travancore, in British Sikkim, in the Kangra valley in the Punjab, and at Mahabaleshwur, in the Bombay Presidency. In Ceylon the success that has attended the introduction of the Cinchonas has been most marked. From the Himalaya the accounts are no less promising; there are now five plantations for the cultivation of Cinchona, with an aggregate total in April, 1867, of more than 1,558,000 young trees, of which a large proportion belong to the species which furnish what are called the crown and the red barks.

But however rapid and vigorous the growth of the Cinchona in India, the culture of the tree would avail but little unless the bark were as rich in alkaloids as that produced in South America. At the outset of the enterprise many persons capable of judging had considerable doubt as to the results. From the recent numerous analyses of Howard, De Vry, Broughton, and others, it is however evident that the percentage of alkaloids in the bark grown in India may even exceed that obtainable from the same sort of bark grown in its native country. Another point worthy of notice is that the proportion which one alkaloid bears to another varies extraordinarily in the same species,—sometimes quinine predominating, sometimes the less valuable cinchonine or cinchonidine. We are as yet to a great extent ignorant of the causes of this variation, but they will to all appearance become manifest, as is already the fact that the rapid

reproduction of the bark and its richness in alkaloids is favored by coating the roots and stems with moss after the removal of the bark. Proc. Brit. Ph. Conf. 1868, 9.

Howard and De Vry have continued their studies on the Cinchonas cultivated in the Indian Archipelago. A comparison of former and recent analyses furnishes sufficient evidence that the percentage of alkaloids of the bark of the roots and of the stem is subject to slight variations, but that in most cases the bark of the root surpasses that of the stem in alkaloids. But this seems to be the case only with the transplanted and cultivated Cinchonas. N. Tijdsch. Ph. in Nederl. 1868, 193.

*Culture of the Cinchonas in Jamaica.* The introduction and acclimatisation of the Cinchonas on the island of Jamaica has been successfully carried on since 1867. Half-yearly Comp. Med. Sci. Jan., 1869, 55.

*Culture of the Cinchonas in Algeria.* The attempts which have been recently made to introduce into Algeria the cultivation of the Cinchona trees will to all appearance be attended by success. Analyses of the bark thus cultivated have shown that the alkaloids are quite as abundant in these specimens as in others coming from the usual sources. Cosmos, 1869.

*Culture of the Cinchonas in California.* The culture of Cinchonas on the slopes of some of the Californian sierras has been the subject of repeated consideration by the Sacramento Medical Society, which pledged its support to every effort to endeavor to find a proper habitation for the Cinchona trees in California, provided the requisite plants or seeds are furnished by the Agricultural Bureau at Washington. Pacif. Med. and Surg. Journ. Feb., 1869.

*Assay of Cinchona Barks.* Hager, who has given one of the best methods for testing the quality of opium (Ph. Centr. Halle. 1868, 1 & 2) suggests the following method for assaying the cinchona barks, which has the advantage over other methods, that it takes only about six to eight hours, requires only a small sample, and is very correct in its results: 10 grammes of the powdered sample are boiled for quarter an hour with about 130 grm. water, to which have been added 20 drops of potassa lye; then

15 grm. diluted sulphuric acid are added, and the boiling continued fifteen to twenty minutes. The liquid is then brought on a filter, and the filtrate collected in a graduated cylinder glass. 60 grm. (C. Centim.) are then precipitated with 50 grm. of a solution of picric acid (trinitrophenol) saturated at a medium temperature. After half an hour the precipitate is collected on a tared filter, washed and dried between unsized paper. The picrates of the cinchona alkaloids are as good as insoluble in the menstruum, and in the water used for washing.

From the quantity of this picrate the quantity of the alkaloids in the sample is calculated. Official bark ought to contain 3.5 per cent. alkaloids, which would correspond to 8.24 of the picrates. 10 grm. of the sample, when submitted to this assay, consequently should give 0.824 grm. alkaloid-picrates. Pharm. Centr. Halle. 1869, Nos. 18 & 19.

Another, but more circumstantial test for the quality of cinchona bark is proposed by Dr. Schneider, in *Zeitsch. d. öst. Ap. V. vi. 351*: 20 grm. calisaya, or red bark, and 50 grm. when the sample is pale bark, are powdered and mixed with one-fourth of their weight of hydrate of lime; this mixture is placed in ten times its weight of boiling alcohol of ninety per cent. strength, filtered, and the residue washed with boiling alcohol. The alcoholic solution is acidified with acetic acid, the alcohol removed by distillation, or evaporation, the residue evaporated to dryness, re-dissolved in water acidulated with acetic acid, again filtered, again evaporated to a small bulk, and treated with hydrate of lime. The ensuing precipitate is washed with a small quantity of water, the residue dried, next treated with boiling alcohol, this solution again evaporated to dryness, and the residue weighed. The weight to be obtained from the above named quantities should not be less, for cinchona rubra, than three-fourths of a gramme; for quina regia and fusca not less than half a gramme, provided the barks be of good quality, and the operations conducted with care. Ch. N. A. R. June, 1869. Am. J. P. Jan., 1869.

(This method has two important points which render its practical use of questionable value. The great number of successive operations not only require much time and labor, but

necessarily occasion some loss of the cinchona alkaloids, which loss is considerably increased by the solubility of the alkaloids in the unavoidable excess of hydrated lime.)

*Ipecacuanha.* For some years past an ipecac root from New Grenada, very similar to the Brazilian, has made its appearance in commerce. M. J. Lefort, Journ. de. Ph. Mars, 1869, has subjected this root to comparative tests with the officinal root by preparing the tannates of emetia, which are but slightly soluble. One hundred grammes of the Brazilian ipecac yielded 1.449 grs. tannate of emetia, whilst the equal quantity of the New Grenada ipecac yielded 1.341 grs. average.

In studying the chemical properties of emetia, M. Lefort found that its nitrate is but little soluble in water, so that an aqueous solution of acetate of emetia is precipitated by nitrate of potassa, which precipitate agglutinates into a brown extract like mass soluble in alcohol. An analysis based upon this reaction yielded 1.350 parts nitrate of emetia from one hundred parts of Brazil ipecac, and 1.082 parts from one hundred parts of Grenada ipecac.

These researches prove that the Brazil ipecac is a little richer in alkaloid, and that it seems to contain more of the resinoid odorous matter, and more of the brown coloring matter. As regards the proportion of ligneous fibre in each, one hundred parts of the Brazilian root gave 18.75 parts, and one hundred parts of the New Grenada root 20.01 parts of ligneous fibre. M. J. Lefort comes to the conclusion that, though allied in composition and properties, the New Grenada ipecac should not be substituted for the Brazil root, until perhaps the time should arrive when the latter should become exhausted. A. J. Ph. July, 1869, 305.

#### PAPAVERACEÆ.

*Papaver somniferum*, L. The literature on opium, its culture and production, has been greatly enriched by excellent and comprehensive essays.

Contributions on the culture of poppy and the production of opium are—

*For Egypt*, by Dr. Figari Bey, in the Journ. de Pharm. et de Chim. 5 Ser. vii. 37. The author gives a report on the localities

and mode of poppy culture. The Egyptian opium contains from 8 to 9 per cent. morphine. Its falling into discredit is due to adulteration with mucilage, with the medulla of the fruits of *Zizyphus lotus* and other substances.

The most prominent publication on *Turkey opium* is by Prof. Fayk Bey, of Constantinople, entitled *Monographie des Opiums de l'empire ottoman envoyés à l'exposition universelle de Paris. 1867, Paris.*

The author gives a full account of the production of opium in those parts of the empire which furnish most opium; he states that the appearance of the drug does not invariably furnish a conclusion as to its quality and strength. Fayk Bey submitted ninety-two sorts of opium from various localities to examination on their percentage of morphia and narcotine and on the quantity of water. This most comprehensive schedule renders it evident that the varieties of poppy furnish opium of various strength in alkaloids; they further show that the proportion between price and quality do not coincide, and that the real value of opium can solely be determined by chemical examination.

The trade of this important drug in Asia Minor and Turkey has hitherto been in a remarkably unsettled state. Only Smyrna has an established opium market, which influences price and has some control on the quality. Constantinople has no emporium for opium; only lately some of the leading houses have made arrangements for a better control of the market.

*In Germany* the culture of Opium is progressing. Poppy is extensively cultivated there, especially in the Prussian provinces of Brandenburg, Silesia and Saxony, and the production of Opium has frequently been tried. Oscar Desaga has in 1868, in a pamphlet "*Ueber den Anbau des Orientalischen Mohns und Opiumgewinnung auf einheimischem Boden,*" published a lucid exposition of the present state of the culture of Opium in Germany as well as in France, stating all the experiments and their comparatively satisfactory results in regard to the quality of the product as well as to the profitability of the culture. Samples of Opium obtained in the neighborhood of Berlin contained from 8 to 11 per cent. morphia. *Viert. Schrift.* xvii. 481 & A. J. Ph. 1869, July, 311.



*In the United States* poppy will undoubtedly yield opium of usual strength if properly prepared. The few experiments as yet made have furnished no conclusive results.

*Opium adulterated with Lead.* Dr. Risk, in Morgan, Ky., reports to the Cincinnati Medical Repertory, June, 1869, that an opium which he bought in a drug store in Cincinnati contained an admixture of five per cent. metallic lead in small particles. See also Amer. J. Ph. 1864, p. 100.

*Morphia strength of Opium.* There are to be reported from among a number of communications, four valuable papers about the subject from Hager, Jacobsen, Schneider and Rieckher.

*Hager's Process:*—5 grms. of the powdered dry sample are triturated with 2 grms. calcium hydrate (slaked to dry powder;) the mixture is heated with about 50 grms. distilled water for about one hour, then the whole is transferred to a filter previously wetted, the residuum is washed with warm water until the filtrate shows only a slight yellow color and weighs about 80 grms. This is evaporated to 50 grms., put into a bottle, and, when still tepid, 15 decigrms. ether and 6 drops pure benzene are added and then shaken. (The ether produces the separation and the benzene prevents the adhesion of the morphine on the glass). Afterwards  $3\frac{1}{2}$  grms. ammonium chloride in small crystals are added, and when they have dissolved the shaking is continued (when shaken before the crystals have disappeared the morphine adheres to the glass.) The bottle is then allowed to stand for three hours. All morphine is then separated; it is collected on a damp filter, is washed and dried at about  $50^{\circ}$  C.

A number of comparative analyses evinced that one-tenth of the weight of morphine has to be subtracted, being the average amount of the impurities. Hager's Cent. H. ix, 1.

*Jacobsen's process* is similar to Hager's; it takes less time and is said to be very exact:— $6\frac{1}{2}$  grms. of the dry powdered sample are triturated with 3 grms. calcium hydrate and as much water as to form a soft pill mass. This is transferred, with so much water that the whole weighs 74.5 grms., into a small retort of 100 to 150 grms. volume and previously tared; the stoppered

retort is then heated in the water-bath to about 90–92° C. for one hour. Then the retort, after cooling, is weighed, the amount of the evaporated water is exactly restored and the liquid is then filtered. The filtrate is collected in a test tube of about one inch in width, and six to seven inches in length, and upon which has been made a mark indicating exactly fifty cubic-centim. distilled water. This volume is generally obtained from the filter; in case it be a little more the funnel is withdrawn when the filtrate reaches this mark. To these 50 cubic-centim. liquid are added, when still tepid, 3 c. centimet. ether and 8 drops benzene. The test tube is corked and shaken, which is continued after the addition of 4½ grms. ammonium chloride in powder. After settling for some hours the liquid is transferred upon a small, damp, tared filter, washed with some water first, then with about 3 grms. chloroform, and, after this has filtered, repeatedly with 1½ grms. chloroform each time. Finally the filter is carefully dried and weighed. The weight of the precipitated morphine from 5 grms. opium, multiplied by 20, gives the percentage of this alkaloid. *Nieu Tijdschrift v. d. Ph. in Nederland* 1868, p. 361.

*Schneider's process* for testing the quality of opium:—10 grms. of the dry and powdered sample are treated with a mixture of 150 grms. water, to which 20 grs. of pure hydrochloric acid are added; the residue, after extraction, should not exceed 4.5 grs. weight; to the acid fluid 20 grs. of common salt are added, and the precipitate is collected, after twenty-four hours, on a filter, and washed with a solution of common salt; to the filtrate ammonia is added, and the fluid left standing for twenty-four hours; the crystals which have separated are collected, redissolved in acetic acid and precipitated with ammonia; the precipitate so obtained is washed, dried and weighed; its weight should not be less than one gramme, corresponding to 10 per cent. of morphia in the opium. *Zeitsch. d. oest. Apoth. Ver.* 1868, 16, 351, & *Am. J. Ph.* Jan., 1869, 21.

Rieckher has submitted the tests of Schacht, Hager and Duflos to a comparative examination, and has come to the conclusion that the methods of Schacht and Duflos (given in former reports to this Assoc.) and of Hager, render very accurate re-

sults. Rieckher is of the opinion that any of these tests requires too lengthy a description to be incorporated into a Pharmacopœia, and that these may merely require an opium powder containing not more than 40 p. cent. constituents insoluble in water, and at least 14 per cent. impure morphine, as obtained in the above tests. N. Jahrb. f. Ph. xxviii, 257.

*Nature of Opium.* F. A. Flückiger (London Ph. J. Oct., 1868,) examined opium with a view to ascertain its constituents besides its well-known numerous alkaloids, and its meconates and thebolactates which form only about 33 per cent. of the dry drug. Flückiger exhausted opium successively by benzol, by alcohol, by hot and cold water, by diluted acetic acid and finally by ammonia. Benzine extracted 10·83 per cent., of which 4·5 per cent. were narcotine and 6·33 p. c. caoutchouc; the residue treated successively with the other menstrua gave off to alcohol 57·67 per cent. including all the alkaloids, to the water 9·67 per cent. mucilage, to acetic acid 1·73 per cent. and to the ammonia 7·33 per cent. pectic acid, a substance heretofore not ascertained in opium. Flückiger states that the mucilage in opium is not analogous to gum arabic and to bassorin, so that opium wherein arabin is found can contain this only as an adulteration. Am. J. Ph. Nov., 1868, 526.

#### UMBELLIFERÆ.

*Cicuta virosa*, L. The corms of *cicuta virosa* have been the subject of an elaborate examination by von Aukum. 15 pounds of the dry corms yielded three ounces essential oil; it is neutral, separates no stearopten and weighs 0·87038 at 18° C.; it consists mainly of a hydrocarbon, called by von Aukum *cicuten*, which is not poisonous; von Aukum's pains to find the pretended poisonous volatile *cicutin*, which Pollex and Wittstein aver to have obtained, were unsuccessful. The existence of such a substance, therefore, seems to be questionable. J. f. prakt. Ch. 105, 151.

*Conium maculatum*, L. In a paper on conium published in the Transact. N. Y. State Med. Soc. 1867, Dr. W. M. Smith comes to the conclusion that, with respect to their therapeutical effect, the immature fruits of conium seem to be preferable to the leaves. Am. J. P. 1868.

## AURANTIACEÆ.

*Citrus medica*, L. W. W. Stoddart read before the Norwich meeting of the Brit. Pharm. Conference a paper on lemon-juice and its decomposition. Among the practical results are:—when lemon-juice is carefully evaporated it yields a rich brown extract, which is very peculiar, both in smell, taste and appearance, so much so that it is easy to tell whether or not it is genuine juice. One ounce of lemon-juice will average 27 grains of dry extract, but it seems impossible to evaporate the juice to dryness without decomposition. Lond. Ph. J., Oct. 1868.

## ROSACEÆ.

*Rosa*. F. A. Flückiger has examined the stearopten from English rose-oil; it is devoid of the smell of rose-oil, emits, when heated, an offensive odor like heated wax or fat, is very stable and the product of its oxydation is mainly succinic acid. The composition seems to correspond to the formula  $C_nH_n$ . Lond. Ph. J. Sept. 1868, 147.

## MYRTACEÆ.

*Melaleuca*. H. Werner has examined eight samples of cajeput-oil for the purpose of ascertaining whether the color was due to copper or not, and detected the presence of that metal more or less distinctly in each of them. Still another sample of a fine green color, contained no trace of copper, and differed from others, which showed at 13°C. densities from .921 to .930, by a sp. gr.=.937, and by congealing at  $-24.5^{\circ}$  C. against several of the other samples at  $-28^{\circ}$  C. Ph. Zeits. f. Russl. 1868.

## KRAMERIACEÆ.

*Krameria triandra*, L. Dr. W. F. Gintle, in the Zeitsch. d. oest. Apoth. Ver. 1869, 11, suggests that some varieties of kino obtained from the order Dalbergiæ are used as substitutes or adulterations of extract of rhatany, which may account for its containing the so-called rhatanin, unless some portion of *Krameria triandra* should contain it.

## POLYGALACEÆ.

*Polygala senega*, L. The roots of *Cypripedium pubescens*, Willd., and probably of *Cypripedium parviflorum*, Salisb., have been observed in commercial senega root, by A. E. Ebert, and F. A. Flückiger. Schweiz. Woch. f. Ph. 1867, 392.

## LAURINEÆ.

*Cinnamomum*. A. Schnitzlein has published an abstract from Miquel's great work, *Annales Musei botanici lugduno-batavi*, the conclusions of which are:—1, Ceylon cinnamon is collected from the varieties of *Cinnamomum zeylanicum*, L. 2, Malabathrum cinnamon is collected in East India, from *Cinnamomum Tamala* and *Cinn. albiflorum*, and probably also from *Cinn. dulce* and *Cinn. Loureirei*, in Cochinchina and China. 3, The origin of *Cassia lignea* or Xylocassia has not yet been fully established; it is principally collected in Malabar. 4, *Cassia cinnamomea* or Chinese cinnamon is the bark of *Cinn. aromaticum*, which is extensively cultivated in parts of China and in the Indian Archipelago. Cassia buds are derived from the same species. N. Rep. Ph. xvii, 412-427.

## RHAMNACEÆ.

*Rhamnus frangula*, L. The coloring principle of Buckthorn has repeatedly been examined without satisfactory results, because the respective chemists did either not obtain it pure enough or they overlooked its glucosidic nature, and did not account for the products of its splitting up. Casselmann first succeeded in the preparation of franguline in a pure state by boiling the bark with ammoniacal water, precipitating with hydrochloric acid, boiling the precipitate with alcohol and precipitating the alcoholic solution with subacetate of lead. The red lead compound is decomposed by sulphuretted hydrogen, and afterwards the frangulin is extracted by boiling alcohol. This solution is concentrated by evaporation, and the frangulin is precipitated by water. By repetition of this latter operation the frangulin is obtained pure as a yellow mass with crystalline texture; it is almost insoluble in cold water, slightly soluble in cold but more readily in boiling alcohol, soluble in alkaline solutions, and then exhibiting a brilliant purplish-red color. Its ammonia solution is at first colorless, and becomes, after a while, a brilliant red. It fuses at 226°C. Its formula is  $C_{20}H_{20}O_{10}$ ; acids split it into glucose and frangulinic acid and traces of difrangulinic acid, which have been studied by August Faust. Pharm. Cent. H. 1869, 24.

Buchner's Rhamnoxanthin and Kubly's Avornin, are but impure frangulin. Zeitsch. f. Chem. 1869, No. 1.



## BURSERACEÆ.

*Amyris elemifera*, L. Among the Mexican drugs sent by Mr. Schaffner, in Culiacan, Sinaloa, Mexico, to Germany, and examined by Prof. Henkel, were two specimens of Mexican Elemi. The one forms a hard light yellow resin of strong odor, and is derived from the *Amyris elemifera*, L. growing in southern Mexico. It resembles the commercial variety of Manilla Elemi. The other specimen is inferior and is evidently a mixture of resins of different species of *Amyris* collected in Western Mexico, along the Pacific Coast, and known there as "copal de la virgen." N. Rep. d. Ph. xvii, 483.

## LEGUMINOSÆ.

*Senna*. For the last two years the chemistry of senna leaves has been the subject of several elaborate researches by Kubly, Rau, Ludwig and Stütz, Dragendorff, Groves, Hager and others. The practical results of their labors are mainly:—The purgative effect of senna is due to a substance called, by its discoverers Lassaigne and Fennelle, cathartic acid, which probably is a mixture of several substances not yet properly defined.

Mineral acids, aided by heat, destroy this active principle of senna, organic acids precipitate it from its aqueous solutions, but do not decompose it, even on boiling, (Groves.) Antimonial salts, tannin and the prussiates have no effect upon it. Alkalies, aided by heat, act destructively upon it. Long continued action of heat decompose it as does fermentation.

Decoctions and extracts of senna are therefore to be made with proper precaution and celerity, or are preferably abandoned in favor of recent and quickly-made infusions. Fermentation has to be obviated in all preparations of senna, they being rendered completely inert thereby. As a prevention thereof, a slight addition of chloroform and alcohol to the infusion and syrup of senna is recommendable.

Several pharmacopœias prescribe the leaves exhausted by alcohol; the variable color of these leaves was found, by Dr. Hager's experiments, to be due to the temperature of maceration, and besides to the mode of expression. The leaves take a dark-brown color when extracted at about 20°C., but they retain their

natural green color when extracted at  $+10^{\circ}$  C. According to all appearances, the alcoholic exhaustion of the senna leaves is of no, or only secondary, necessity, whilst the strength and action of senna and its credit as a cathartic greatly depends on the proper preparation and preservation of its official preparations. Proceed. of the Brit. Pharm. Conf. 1862, 40.

*Copaifera species.* Strauss submitted the volatile oil of copaiba balsam to an examination. After rectification with calcium chloride its spec. grav. is 0.921, its boiling point  $250^{\circ}$  C.; it dissolves in three volumes of alcohol. It is resinified by nitric acid and forms with chlorhydric acid a crystallized compound. Since its vapor density is twice as large as that of turpentine oil its formula is represented as  $C_{40}H_{32}$ . The alkaline solution of the resins remaining behind in the distillation of the oil contains an acid which the author calls meta-copaivic acid  $=C_{44}H_{34}O_8$ , crystallizing in white crystals soluble in alcohol. Maracaibo balsam contains the same volatile oil, but not the acid. Annal. d. Ch. & Ph. 148.

*Gum arabic.* From Sinaloa, Mexico, Prof. Henkel received specimens of a gum very similar to Senegal gum. It is said to be derived from *Prosopis dulcis*, Schiede, *Prosopis horrida*, Kunth, *Prosopis inermis*, Bonpl. & Humb. These trees and others of the same genus are frequent in the terra caliente of Mexico. Schaffner, of Culiacan, mentions, besides, a gum derived from *Spondias myrobalsamus*, L. These gums can be substituted for the Senegal gum. N. Rep. Ph. vii, 481.

*Ferreira spectabilis*, Fr., Allem. It appears that in the Brazils there is in use, as a febrifuge, a resin collected from several trees; it is known in some parts of the country as sulphato, in others as resina d'angelim pedra. Dr. W. F. Gintl (Sitzungsber. d. Wiener Akad. d. Wiss. 1868) finds that this substance is almost insoluble in cold water, in alcohol, and ether; it is neutral, dissolves in acids without neutralizing them, and crystallizes from these solutions in combination with the acids. Diffused in water and boiled with a little nitric acid, a rose-red color ensues, changing to ruby and finally to blue; more nitric acid produces a green, and finally a brown powder. The liquid obtained by

treating the resin with concentrated sulphuric acid, and then neutralizing with carbonate of baryta, is colored violet by ferric chloride; it fuses and volatilizes; its composition is  $C_{20}H_{13}NO_6$ . All these reactions prove the substance to be identical with the so-called rhatanin found by Dr. Emil Ruge in the South American rhatany extract, and which cannot be obtained from rhatany root. Zeitsch. d. oest. Apoth. Ver. 1869, 32.

*Physostigma venenosum*. W. Procter, Jr., suggests the following formula for the tincture of Calabar beans: Take 1 oz. beans, 7 oz. alcohol, and 3 oz. water. The powdered beans are moistened with half an ounce of the menstruum and packed in a conical tube, and percolated by the whole menstruum, or so much of it that half a pint of tincture is obtained.

To calabarize paper, two ounces of this tincture are evaporated to three drams on a water-bath, and, when cold, filtered. The paper deprived of its size is saturated three or four times with this extract. Am. J. Ph. Nov., 1868, 520.

*Myroxylon punctatum*, Klotzsch. M. Delafontaine has recently continued his researches on Peru balsam. He obtained a substance believed to be cinnamein, which, however, appears to be a mixture of cinnamic-benzyl ether and cinnamate of cinnamic ether. This mixture boils at  $305^{\circ}C.$ , but is then also partly decomposed, leaving a resinous residue, while, when the operation is pushed rapidly, inflammable gases are also given off. In order to prevent any secondary decomposition, a portion of cinnamein was saponified in the cold with an alcoholic solution of caustic potassa, and the result of this operation treated with water; this dissolved cinnamate of potassa, and an oil was set free, which, by means of fractional distillation, was separated into benzyl-alcohol (boiling at  $205^{\circ}C.$ ) and cinnamic alcohol (boiling at  $222^{\circ}C.$ ), the quantity of the latter being about half as much as that of the former. The results of the researches made by Plantamour on this subject about thirty years ago were the same. The chief mass of the balsam is therefore this mixture, known as cinnamein, but it also contains variable quantities of other substances, among these toluol, and some ethereal oils not properly known in separate state. Chem. News, A. R., July, 1869, 35.

The root of *Periandra dulcis*, Mart., is employed in Brazil as a

substitute for liquorice root, with which it, according to Dr. Peckolt, has in common the same constituents, including glycyrrhizine. It yields about thirteen per cent. dry extract, equal to the best commercial liquorice.

#### BIXACEÆ.

*Bixa orellana*, L. W. Laird (Lond. Ph. J. Sept., 1868, 156) found that roll annatto, instead of being the best commercial annatto, frequently is merely a paste of farinaceous substances and common salt, colored with about fifteen per cent. of annatto.

#### STERCULIACEÆ.

*Stercularia tragacantha*, Lindl. It is well known that various plants furnish exudations equal or similar to tragacanth. Besides the East Indian tree *Stercularia ureus*, Roxb., which exudates abundantly a substance much resembling tragacanth, recently a gum from western tropical Africa has made its appearance in the market, which, when the Niger and its tributaries are once opened to commerce, may possibly form an important substitute for its older known rival from Asia Minor. Specimens of this African tragacanth transmitted from the royal gardens at Kew have been submitted for examination to Dr. Flückiger. It consists of irregular, knobby, undulated, drop-like or stalactitic masses of a pale yellowish hue or almost colorless, in small fragments nearly transparent, but seen in mass somewhat opaque by innumerable cracks, which render it more brittle than true tragacanth. With twenty parts of water it forms, like tragacanth, a thick tasteless jelly; with forty parts of water the jelly becomes more fluid; it reddens litmus. The filtered liquid behaves towards neutral and basic acetates of lead like the *astragalus tragacanth*, but it differs from this by the complete lack of any cellular structure and of starch. Its chemical composition corresponds much with gum arabic. For pharmaceutical use it seems equal to the *astragalus tragacanth*. London Ph. J. May, 1869, 641.

#### DRUGS DERIVED FROM THE ANIMAL KINGDOM.

*Honey*. W. W. Stoddard publishes an essay on honey, its origin and formation, and comes to the conclusion that honey is

originally formed from a solution of cane sugar (sucrose), which gradually changes into grape sugar (glucose), and forming, as it proceeds, a small quantity of mannite, formic acid and alcohol. The color and flavor are due to and derived from the aroma of the flowers which the bees have visited.

The adulteration of honey consists mostly in cane sugar or in starch sugar. The former is detected by the microscope, since the crystals are not only easily recognized, but generally the sugar-itch insects, in all their stages of growth, occur in the field of vision. Starch sugar being nearly identical with the true glucose of honey, is hardly satisfactorily to be detected, except perhaps by presence of sulphuric acid from its preparation, or by some unconverted starch. Lond. Ph. J. Sept., 1868.

According to a notice in No. 34 of the *Deutsche Ind. Zeit.*, honey is sometimes met with in commerce which is nothing but glucose obtained from starch. This adulteration may be detected by means of the presence of sulphuric acid or unconverted starch. Ch. N., A. R., Dec., 1868, 342.

*Clarifying Honey.* H. Ludwig, after a review of all methods proposed and in use for clarifying honey, comes to the conclusion that the simplest and best mode is to mix an equal bulk of water with the honey in a pan over the fire, and to heat them to boiling, then to put it into a vessel and place it in a cool cellar until clear, so as to be readily decanted from the sediment; the latter, with some water, being transferred to a filter. It will be found advantageous to add some white of egg to honey which may be very impure. The evaporation should take place on the water-bath. N. Jahrb. d. Ph. xxiv, 118.

In a notice in the *Polyt. Notizbl.*, No. 21, 1868, the purification of honey is proposed in the following manner: The diluted honey is heated with a thin pulp of white clay; after boiling for two to three minutes skim and strain, or, if necessary, filter. Then boil down to the proper consistence.

*Wax.* Canaiiba wax is, according to a communication to the Chem. Soc., derived from the glaucous coating of the younger leaves of the *Copernicia cerifera*, a palm in Brazil. In the crude state it is of a greenish-yellow color, and melts at 183° F. Ch. N. A. R. April, 1869.



*Castoreum.* Hager suggests the following mode to determine the value and quality of castoreum:—1. The taste of the Siberian is far stronger, it being richer in castorin. To determine the origin of samples of castoreum a weighed quantity of each sample is repeatedly extracted with pure benzine, (petroleum ether) and the solutions are allowed to evaporate on watch-glasses. When equal quantities of the different samples are taken the disk containing extract from Siberian castoreum will be covered thicker with grayish castorin than samples of Canada castoreum. The author found 4.6 per cent. residue from the former, against 1.98 per cent. of the latter, including part of the volatile oils. 2. The above residue, when extracted with chloroform, yield a brown resin, which, from the Canadian castor is quite hard and of slight odor, whilst that from the Siberian is more glutinous and of a stronger odor. 3. The powders of both, when treated first with some alcohol and afterwards with diluted hydrochloric acid, yield, after standing for 10 to 20 hours, a supernatant liquid, which is yellow or light brown with Canadian, but dark brown with Siberian castor. 4. When the powdered samples are macerated some hours with ammonia solution they yield clear supernatant liquids, of which that of the Siberian sample is far darker. 5. The alcoholic tincture of both, when diluted with water, gives a milky liquid, which, on addition of ammonia solution, turns clear if the tincture was made of Siberian castor, but remains more or less turbid with the Canadian. Hager's Centr. Halle 1869, No. 8.

*Cochineal.* M. Himmelmann calls attention to an admixture of sulphate of baryta not unfrequently met with in commercial cochineal. This adulteration is made with great dexterity, by fastening it upon the cochineal by means of some adhesive material. Himmelmann found 8, 12, 16, 18 and 25 per cent. baric sulphate in various samples of cochineal. The adulteration may be estimated by calcination of 100 grains of the sample; the addition of some ammonium nitrate facilitates this process. The weight of the remaining ashes, after due deduction of  $1\frac{1}{2}$  per cent., being the proper weight of cochineal ashes, gives the percentage of the admixed inorganic substance, in most cases baric sulphate. Der Apotheker 1869, No. 2.

## MISCELLANEOUS DRUGS.

*Drugs at the Paris Exposition.* Prof. von Schroff has given, in N. Rep. Ph. Vol. xviii, 65-93 and 118-154, an elaborate and valuable report on the pharmaceutical drugs and some of their preparations at the recent Paris Exposition, and has added a critical exhibit of our present knowledge of some of the most important drugs.

*Mexican Drugs.* Mr. Schaffner, of Culiacan, State of Sonora, Mexico, has sent a number of specimens of Mexican drugs to the late M. Guibourt. Prof. Henkel has examined and reported on them in N. Jahrb. Ph. 29, 14. They are mainly:

A gum like kino, derived from *Croton draco*, Schltd.

An arabin derived from several species of *Proposis*.

The seeds of *Hura crepitans*, a powerful cathartic.

The seeds of *Croton tinctorium*, a cathartic.

A gum lack derived from a Croton called *sonorensis*.

Several specimens of elemi derived from *Amyris elemifera*, L.

Tamarinds from *Cassia fistuloides*, Collad., and from *Tamarindus occidentalis*, Gaertn.

The bark of *Coutarea latiflora*, DeC., used as a febrifuge in Sonora.

The rootstocks of *Veratrum frigidum*, Schltdl.

*Peruvian Gum.* Recently in Germany a powder has come in use for thickening and fixing colors upon cotton goods and wall papers. It is said to be a powdered root derived from an unknown plant in Peru; the roots are one to two inches long, of the thickness of a quill and over, very hard, reddish brown externally, internally yellowish white with a yellow centre; alcohol dissolves some coloring matter. The powder swells with 15 to 17 parts of cold water to a stiff paste of the consistency of honey, which is free from starch and sugar. Its solubility in dilute acids and potassium hydrate and its swelling with water prove the so-called Peruvian gum to consist mostly of bassorin. Its thickening property is said to be six times greater than that of Senegal gum, which, however, possesses greater adhesiveness. Deutsche Ind. Zeit. 1868, 224.

*Ylangylang.* Under this name the volatile oil of the flowers

of *Unona odoratissima* was recently introduced into perfumery. According to a communication of F. Steck, of Manilla, these flowers are collected from a tree indigenous on the Philippine Islands. The present price of this oil comes very near that of rose oil. Hager's Cent. H. ix, 46.

*Ramie.* The cleaned fibre of this plant is, without bleaching, white, and finer than flax or hemp fibre. The plant is perennial, and the crops from it are taken like those of cane, by cutting it at the ground; from the ratoons a new growth springs up, giving from three to four and even five cuttings a year in Louisiana, middle and lower Mississippi, Texas, Alabama, Georgia and Florida. To all appearance this fibre will take an important place in industry, and consequently contribute to the prosperity of the Southern States. Journal of Agriculture, 1869.

*Mineral Caoutchouc.* In the southern portions of the Brit. Colony Adelaide, South Australia, have recently been discovered deposits of a carboniferous substance, which hitherto has only been found in small quantity in the coal strata of Derbyshire, (England). It is a mineral caoutchouc, so-called from its general appearance and elasticity. Analysis proves it to yield 82 per cent. or more of a pure hydrocarbon oil. This discovery is believed to be valuable, since the substance may be applicable to the manufacture of gas and anilin dyes; it is also important from its indication of the existence of oils or other carboniferous deposits. Mining Journal 1869.

(This material, known in mineralogy as elaterite, is also found in a coal pit near Nantes (France), at Neufchatel (Switzerland), and on the Island of Zante.)

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## PHARMACEUTICAL CHEMISTRY.

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### CHEMISTRY OF THE INORGANIC BODIES.

#### NON-METALLIC ELEMENTS.

##### OXYGEN.

*Perfectly pure oxygen gas* is obtained, according to Böttger, from permanganate of potassa by heating. This salt yields only

about 10 per cent. its weight of oxygen, but the gas is perfectly free from chlorine and from ozone. As residue remains a mixture of manganate of potash and oxide of manganese, readily reconvertible into permanganate. Ch. N. A. R., June, 1869, 322.

*Production of oxygen and chlorine.* A. Mallet has continued his researches on the production of oxygen, and has added some new interesting observations. Cuprous chloride may be used either for the disengagement of oxygen, or for the liberation of chlorine, should the production of that body be desired. The absorption of oxygen by protochloride of copper is spontaneous, and takes place at the ordinary temperature in a few hours, provided the air be sufficiently moist. If the temperature be raised, the absorption is more rapid; between  $100^{\circ}$  and  $200^{\circ}\text{C}.$ , or at a higher temperature, in the presence of steam, it is almost instantaneous.

A demonstration of this may be made by means of a balloon, containing some grammes of protochloride of copper, and communicating with a graduated receiver. If the balloon is then heated and several drops of water are injected upon the substance without allowing any communication with the exterior air, absorption takes place immediately, and the water rises into the receiver. By restoring the apparatus to its original temperature and pressure, the oxygen will prove to be completely absorbed, provided the relative proportions have been correct. Thus the protochloride of copper may be oxidized in a few minutes at a temperature differing but slightly from that required for deoxidation.

If upon protochloride of copper, heated to  $100^{\circ}$  or  $200^{\circ}\text{C}.$ , commercial chlorhydric acid be slowly dropped, steam alone will be disengaged, and supposing the addition of acid to be slow enough, and the access of air and renewal of surface sufficient, the odor of hydrochloric acid will be scarcely perceptible, and the protochloride will be entirely transformed into anhydrous cupric chloride,  $\text{Cu Cl}_2$ , which, when heated in a close vessel, instantly disengages chlorine. The simultaneous absorption of oxygen and chlorhydric acid is an important fact, because the extraction of the chlorine from the acid takes place in this case

by means of the atmospheric air, and in an absolutely direct manner. With gaseous chlorhydric acid the action is the same, provided the acid gas contain, as is always the case, a certain quantity of moisture, and that the accession of air be sufficient.

Oxidation and chlorination take place very quickly at high temperatures, but the great advantage is that they yield dry products, the presence of moisture being frequently a source of inconvenience, and the cause for changing the apparatus. *Compt. Rend.* 66, 349.

*Ozon.* Edward Schaer gives, in *Viert. Jahr. Ph.* xviii, 1, a comprehensive review of the history and our present knowledge of active oxygen and its chemical and physiological relations.

#### HYDROGEN.

*Water, its maximum density.* A new series of researches by Rosetti, on the precise temperature at which water arrives at its greatest density, has led to very nearly the same result as H. Kopp's researches, the numbers being  $4.07^{\circ}\text{C.}$  or  $39.326^{\circ}\text{F.}$  Kopp's number 39,  $344^{\circ}\text{F.}$

*Ebullition of water.* In reference to the established fact that water, after having been deprived of air as much as possible, either does not boil at all when heated, or does so with violent sudden starts and concussions, a number of experiments have been made by Kremers, (*Poggend. Annal.*) As a result thereof, the author finds that water, as fully deprived of air as possible, may be heated as high as from  $180^{\circ}$  to  $200^{\circ}\text{C.}$ , without boiling permanently. *Ch. N. A. R.*, June 1869, 320.

*Pure water.* J. S. Stas recommends for the preparation of absolutely pure water, as required for some delicate analytical operations, the following methods, founded on the destruction of organic matter by manganates and permanganates:—A freshly powdered mixture resulting from the fusion of chlorate and caustic potassa with the peroxide of manganese is covered with water. When clear, the water to be purified is mixed with four to five per cent. of this permanganate solution and left standing for 24 hours. The still is then charged with another portion of permanganate solution and an equal bulk of liq. potassæ, and lastly filled to four-fifths with the water previously mixed, after which



distillation is made to proceed as usual. As soon as the contents reach the boiling point, the heat is moderated to prevent boiling over, from violent intumescence which occurs. When this ceases the liquid is merely kept boiling. The first five per cent. coming over are rejected, and the remainder is collected as pure ; though, if wanted absolutely pure from any solid or condensable matter, the water, after this, is once more rectified from a still, a platinum tube, soldered with gold, serving as a condenser. In case the water should contain traces of ammonia, a second distillation becomes necessary, in which some thousandths of bisulphate of potassa or soda is to be added. A. D. C., Jan. 1869, 12.

*For estimating the amount of carbonic acid in the bicarbonates contained in natural waters*, Ch. Lory suggests phosphate of copper. The standard solution of mercurial nitrate hitherto used is objectionable, when the water contains more than traces of chlorides or organic matter, or is charged with sulphates. These impediments are successfully overcome by the use of a standard solution of phosphate of copper. By combining this test with the well-known assay of the natural waters by a standard solution of soap, both before as well as after its boiling, the most important elements for the appreciation of its ordinary and hygienic qualities will be obtained. Ch. N. A. R., Dec. 1868, 306.

*For detecting the presence of nitrates in water*, P. Blunt advises the use of sodium amalgam, as being more delicate than the common test with ferrous sulphate. It depends on the reducing action exercised by the amalgam on nitric acid, and the consequent application of the well-known Nessler test. Ch. N. A. R., Dec. 1868, 311.

*The examination for the purity and for the detection of organic substances in potable and spring waters*, has lately been the subject of several elaborate analyses and studies. Such belong properly to the domain of analytical chemistry, and are altogether too extensive for an abbreviative report on pharmaceutical chemistry. Since, however, such analyses now and then are pressed upon pharmacutists, it may be opportune to refer to the best publications on this subject during the last year :

Heintz, Zeitsch. f. An. Ch. v. 11. Loewe, *ibid.* v, 23. Kubel, Anleitung zur Unters. von Wasser. Braunsch. b. Vieweg. Th. Poleck, Beiträge zur Kenntniss der chem. Veränd. fließender Gewässer, 1869, Breslau. Schultze in 32ter Jahresber. des Rostocker Gew. Ver. Goppelsroeder, Verhandl. d. Basler Naturfor. Ges. Schacht, Arch. d. Pharm. 158, 10. Bellamy, Jour. de Pharm. et de Chim. 5 ser. vii, 93.

#### NITROGEN.

*A new method for preparing Nitrogen Gas* has been suggested by M. Levi; it consists in heating bichromate ammonia in a retort; the salt is thus resolved into green chromium oxide, and into water and nitrogen gas. A. D. C. July, 1869, 123.

*Nitric Acid.* For the detection of nitric acid Hager recommends a process which he calls the sugar-molybdic acid reaction. Any solution containing free  $\text{NO}_5$  or nitrates (the  $\text{NO}_5$  is set free by the addition of some  $\text{SO}_3$  or  $\text{ClH}_3$ ) when heated with a few drops of a solution of molybdate of ammonia remain unchanged, but when some grape or cane sugar is added, after some boiling the solution turns intensely blue, which reaction is reliable when the liquid contains but  $\frac{1}{1500}$  per cent. of  $\text{NO}_5$ .

A still more delicate test for nitric acid has been discovered by M. Braun in the sulphate of aniline. In a test glass about 1 c. c. of pure conc. sulphuric acid is placed; to this is added, drop by drop,  $\frac{1}{2}$  c. c. of a solution of sulphate of aniline. A glass rod is dipped into the liquid to be tested, and then into the mixture in the test glass. On moving the stirrer, when the slightest trace of nitric acid is present, red streaks mark the course of the glass rod. In presence of more than traces of  $\text{NO}_5$  the liquid becomes deep red. This reaction depends upon the formation of fuchsin. It is applicable to detect the least traces of  $\text{NO}_5$  in oil of vitriol and in spring and rain-waters. Hyponitric acid produces the same reaction as nitric acid. This, however, can easily be distinguished by potassium iodide starch acidulated with sulphuric acid. Zeitsch. f. Analyt. Ch. vi, 71. Ch. N. A. R. April, 1869, 202.

## CARBON.

M. Berthelot, in a paper "on the immediate *analysis of different varieties of carbon*," describes the influence upon carbon of various varieties by various agents, such as heat and electricity, chlorine, iodine, oxygen, etc., already formed, also the characteristics of carbon extracted from its various compounds. He states, as the result of his experiments and observations on the latter subject, that carbon when separated from compounds containing hydrogen, takes the condition of amorphous carbon; while that derived from its combinations with chlorine, sulphur, boron, and, perhaps oxygen, inclines to the state of graphitic carbon. Amorphous and graphitic carbons would, therefore, appear to represent, not different conditions of carbon itself, but certain polymeric states of that element. Comp. Rendus.

*Carbon Bisulphide.* M. Millon recommends the following method for purifying carbon bisulphide: It is first washed several times with distilled water, and then introduced into a large retort containing quicklime. After twenty-four hours contact the sulphide is distilled from the lime and received in a flask partially filled with copper turnings, previously calcined to remove organic matters and afterwards reduced by hydrogen. The lime remaining in the retort is strongly colored. The carbon bisulphide thus purified has an ethereal odor, not at all disagreeable. It is with carbon bisulphide thus purified that M. Millon and Commaille have separated the perfume of the most delicate flowers, and from cows' milk have been able to recognize the odors of plants eaten by the animals. Ch. N. A. R. March, 1869, 142.

(This notice has found place in this report because it has widely been circulated through a number of periodicals. Wittstein (Viert. Schr. f. Ph. xviii, 288) justly declares it a gross delusion, concluding his brief notice with the remark that perhaps the next surprise of some French Journals will be the communication of a simple method to completely purify sulphuretted hydrogen from its smell.)

Carbon bisulphide, when exposed to the sunlight for a considerable time, gradually changes, becoming yellow. O. Loew made some experiments in order to study these changes. He

enclosed the bisulphide in sealed tubes and exposed them to the action of the sunlight. Decomposition ensued, and continued until the inner surfaces of the tubes were coated with a brown substance, which prevented the further action of the sun's rays. If some water be present in the tubes this adherence is prevented, and a large quantity of the brown substance is obtained. When these latter tubes were opened the water was slightly acid, by traces of formic acid. The brown compound is, according to the author, a carbon sesquisulphide. *Am. J. Sci. Nov., 1868.*

G. Kennion recommends *carbon bisulphide as a remedy against nervous headache*. A little cotton wool in a small, wide-mouthed bottle is saturated with the bisulphide; the mouth of the bottle is then closely pressed to the temple or behind the ear, or as near as possible to the seat of pain, and so held from five to six minutes; a prickling sensation ensues and the pain is said soon to disappear. *Ind. Bl. 1869, 82.*

*Carbonic Acid.* Rousseau and Piedboeuf propose to obtain carbonic acid from calcium sulphate and charcoal, or coke, by heating a mixture of both in retorts, arranged and made as those in use at gas works. *Ch. N. A. R. June, 1869, 319.*

#### CHLORINE.

E. Ludwig has come to the conclusion, in consequence of a series of determinations of the *specific gravity of chlorine gas*, that this gas belongs to those vapors which only obey Mariotte's law when at a temperature rather remote from that at which they exist in the fluid state. The spec. gravity of chlorine at 20° C. is 2.4807, at 50° C. 2.4783, at 100° C. 2.4685, at 150° C. 2.4609 and at 200° C. 2.4502. According to experiments made by Stas, the spec. gravity of chlorine, deduced from its atomic weight, is 2.45012.

A Belgian chemist has devised a new *process for generating chlorine*. He first forms trisulphate of sesquioxide of iron, by the direct combination of this oxide with sulphuric acid, and then mixes the trisulphate obtained with three equivalents of chloride of sodium, or some other convenient chloride. Upon heating the mixture in dry air, the chloride of sodium yields all its chlorine. *Ch. N. A. R. Dec., 1868, 327.*

*Hydrochloric Acid.* P. W. Hofmann, in Ber. d. Deutsch. Ch. Ges. 1 Jahrg. No. 21, describes a method of preparing pure chlorhydric acid by filling one-third of a vessel provided with a twice perforated clay stopper with crude muriatic acid, and then to allow some sulphuric acid of 1·848 spec. gr. to flow into the acid. Pure chlorhydric acid gas is evolved with gradual evolution of heat; the gas is washed in a Woulffe's bottle and led into water for absorbing. The gas evolution continues until the sulphuric acid reaches the spec. grav. of 1·566. It then contains only 0·32 per cent. chlorhydric acid, so that the slight loss renders this method a very cheap one. N. Rep. Ph. 18, 417.

*Chlorates.* Sulphate of aniline was recommended by Braun as a reagent for nitric acid and the nitrates. According to Boettger, it is also a delicate reagent for chlorates. If any substance containing the slightest quantity of chlorates is introduced into a mixture of two parts sulphuric acid and one part of a solution of sulphate of aniline, the liquid acquires a splendid blue color. Hager Cent. Halle, 1869, 8.

*Alkaline Chlorides.* According to Kuentz and Jossinet, the decomposition of alkaline chlorides is readily and economically effected by the combined agency of heat and high-pressure superheated steam. The chlorides are brought to fusion, and while in that state a jet of steam is forced through the fused mass. Chlorhydric acid is formed, together with caustic alkali, or, if at the same time carbonic acid is injected along with the steam, the carbonate of the alkali is formed. Monit. Scient., No. 295.

*Organic Chlorides,* according to A. Lieben, are converted into iodides by the action of concentrated iodhydric acid. This method of conversion seems to be a general one, and subject to limitation only in so far as some iodides at the moment of their formation are converted into hydrides. Wien. Akad. Ber. 1868, 58.

#### BROMINE.

*Potassium Bromide.* M. Baudrimont recommends the following process for detecting the presence of chloride in commercial bromide of potassium: In order first to test for iodine, a small quantity of the sample is dissolved in water, and shaken in a



test tube with an equal volume of bisulphide of carbon. Upon the addition of a few drops of bromine water the bisulphide becomes violet colored if iodine is present. If this be the case, the whole of the iodine has to be removed from the sample by dissolving about two drams of it in water, adding bromine water until violet vapors are no longer visible on boiling, and then testing for iodine in the above manner. Afterwards the solution is evaporated to dryness, to remove the excess of bromine. The potassium bromide thus obtained is free of iodine. The process of its further examination for chloride depends upon the fact that a given weight of potassium chloride requires a much greater amount of a standard solution of silver nitrate than the same weight of potassium bromide; while the bromide for the complete precipitation of one gramme requires 1.428 grm. of silver nitrate, one grm. of the chloride requires 2.278 grms. For the examination of potassium bromide, a standard solution of silver nitrate is first prepared by dissolving, in a litre of water, 10 grms. of the pure salt, each  $\frac{1}{10}$  c.c., corresponding to 1 milligramme of silver nitrate. 1 grm. of the bromide to be examined, freed from iodine if necessary, is dissolved in 100 c.c. of distilled water; 10 c.c. of this solution, representing .1 grm. of potassium bromide, would require, if pure, 14.2 c.c. of the silver solution; potassium chloride would require 22.7 c.c. Ch. N., A. R., Sept., 1868, 152.

*Bromides.* J. H. Bill recommends a method for detecting bromides in urine, based upon the fact that gold chloride does not suffer any change in a solution containing only chlorides, but that the presence of slight traces of bromine produces a yellow color. The urine to be examined is acidulated with nitric acid, and then precipitated with silver nitrate. The precipitate is washed, and when dry is fused with a mixture of chemically pure carbonate of soda and potassa. The mass is dissolved in a little water, with as much hydrochloric acid as will neutralize the solution; this is filtered into a test tube. Another equal test tube is filled to the same height with a solution of sodium chloride. To both solutions is now added one drop of an auric chloride solution; if the first one contains any bromine it will yield a yellowish tint,

especially visible when viewed from above and compared with the second solution. A. J. Med. Sc. July, 1868, 20.

*Detection of Chlorine, Iodine and Bromine.* Phipson and Baudrimont suggest the following method to detect and determine I, Cl and Br. It relates first to I and Br, and is based upon the fact that I is always first separated by Cl, that afterwards it is transformed into iodine-perchloride ( $\text{ICl}_5$ ), and that then Br is set free. In order to apply this test for the examination of iodide potassium for an admixture of bromide potassium, or *vice versa*, a solution of the sample in a test tube is acidulated with hydrochloric acid, and after the addition of some bisulphide of carbon a clear solution of bleaching powder is added gradually, with frequent shaking. When iodine is present it is set free, and dissolves with dark purple color in the bisulphide of carbon; by continued addition of the chloride of lime solution  $\text{ICl}_5$  is formed, which dissolves colorless in the bisulphide. A further gradual addition of the lime solution now acts upon the bromine, sets it free, and imparts an orange color to the bisulphide of carbon.

This test is said to be so delicate as to detect I and Br in mineral waters.

It remains now to examine for chlorine. If the presence of both Br and I has been ascertained by the above test, the latter has to be removed first. To this end the solution of the sample is mixed with a sufficient quantity of bromine water, and heated until no more iodine vapor is evolved; in order to expel all free bromine the solution is evaporated to dryness. The salt obtained consists of the potassium or sodium bromide, but may also contain their chlorides. It is fused with an equal weight of potassium bichromate. The fused mass, when cooled, is triturated and put into a small retort provided with a twice bent glass tube. Strong sulphuric acid is now poured upon the salt, and the whole is moderately heated; the evolved gas is conveyed into aqua ammoniæ. If the salt contained only bromides, bromine gas is evolved and absorbed without change of color; but when chlorides are present the formation of chloro-chromic acid gives rise to a yellow coloration of the ammonia solution. J. de Ph. et de Ch. 4 ser., vii, 191.

For the *detection of chlorides alone in the bromides of potassium and sodium*, the well known test introduced by Wittstein in 1864 answers well.

The most delicate method for detecting Cl, Br and I is, according to Poggendorff's Ann., the spectroscopic analysis.

#### IODINE.

A. Bobierre gives, in the *Monit. Scient.*, a reliable method for the *volumetric estimation of commercial iodine*, based upon Mohr's well known method by means of arsenite of soda with an excess of alkali, but substituting the starch by benzene. Ch. N., A. R., Feb., 1869, 63.

*Iodine from Chili*, in a more or less viscid form, has lately been brought into commerce. According to F. C. Sticht, this iodine contains only fifty per cent. iodine, and eight per cent. soda nitrate among its fifty per cent. impurities. Sticht supposes that this iodine is obtained by the manufacturers by addition of some nitric acid to the last mother-liquors of iodine. They allow the iodine to separate, take off all liquid, and bring the remainder into commerce. *Viert. Schrift. Ph.* 18, 132.

*Iodine and milk.* It is well known that milk takes up iodine, disguising its taste, smell and color completely; since iodine is an antiseptic, iodized milk keeps for some time. Dr. Hager calls attention to this fact, and suggests that this perhaps is the mildest form of administering iodine. Its therapeutical effect seems to be equal only to about one-fifth of the iodine.

Hager thinks that iodized milk will soon become a favorite form of administering iodine, and suggests the following mode of preparation: one part of iodine, dissolved in ten parts of alcohol, are admixed with ninety parts of fresh warm cow's milk. *Centr. Halle* 1869, 10.

*Reaction between Iodine and Sulphhydic Acid.* When iodine is dissolved in perfectly anhydrous bisulphide of carbon, and dry sulphhydic acid is passed into that solution, no action whatever takes place. Water, as well as an increase of temperature, are required for the formation of iodhydic acid and the separation of sulphur. *Ber. d. Deutsch. Chem. Ges.* No. 8, 1869.

## FLUORINE.

J. Nicklés continued his researches on the compounds of fluorine. They are published in Compt. rend. 65. 109, Journ. de Ph. et Ch. 4 ser. vii. 15, N. Rep. Ph. xvii. 471.

*Hydrofluoric Acid.* G. Gore communicated to the Roy. Soc. the results of his elaborate studies on hydrofluoric acid. He obtained the anhydrous acid by heating dry double fluoride of hydrogen and potassium to redness. The author determined successfully the molecular volume of the anhydrous acid in the gaseous state, prepared by heating pure anhydrous fluoride of silver with hydrogen. One volume of H, in uniting with fluorine, produces not one volume of gaseous product, but two, as is the case of its union with chlorine. Mr. Grove, from analyses and experiments, concludes that the anhydrous acid is destitute of oxygen. Its properties and chemical relations were elaborately examined and established by the author. The spec. grav. of the anhydrous acid was found to be 0.9879 at 55° F; its boiling point 67° F; its vapor tension at 60° F., 7.58 pounds per square inch. Its chemical relations lie between hydrochloric acid and water, but more closely near the former.

The pure aqueous hydrofluoric acid was obtained by Grove by passing an excess of hydrogen monosulphide through the commercial acid, then neutralizing the sulphuric and hydrofluosilicic acids present by potassium carbonate, decanting the liquid after subsidence of the precipitate, removing the excess of sulphhydric acid by argentic carbonate, distilling the filtered liquid in a leaden retort with a condensing tube of platinum, and finally rectifying. Ch. N. A. R. April, 1869, 181.

## SULPHUR.

The important problem, the *recovery of the sulphur from the alkali waste* of the soda works, has lately been considerably advanced. After numerous processes have been in use, Ludwig Mond has introduced a method which is now successfully employed in England, and which is mainly based on the quick oxidation of the alkali waste, or the insoluble residue of the black ash, the first product of Leblanc's process for the soda manufacture. This oxidation is accomplished by alternately

forcing air through the porous residue, and by repeated lixiviation. The mode and theory of the operations are given, as communicated by L. Mond to the Norwich meeting of the Brit. Ass., in the Ch. N. A. R. Dec. 1868, 283—287.

*Determination of Sulphur in organic compounds.* R. Otto suggests for this purpose the heating of the organic substance in a short combustion tube, mixed with chromate of copper. The chromate is prepared by precipitating a solution of potassic bichromate with cupric nitrate and washing the precipitate. The combustion must be proceeded with slowly. The contents of the tube, after cooling, are dissolved in chlorhydric acid, digested with alcohol, and after complete reduction filtered and precipitated with baric chloride. The principal advantage of the use of this copper salt over that of the mixture of sodic carbonate and potassic nitrate lies in the absence of any action on the combustion tube, so that no silicic acid becomes mixed with the product of the reaction. Ann. Ch. Ph. 145, 25.

*A method for the detection of sulphur in organic compounds by means of potassium or sodium* has been published by Dr. Schoenn. A small quantity of the substance to be tested is pulverized and placed in a dry test tube, a small piece of either of said two metals is then added, and upon it a small quantity of the powdered substance is again placed in the test tube; heat is applied, reduction takes place, and sulphide of the metal is formed. The test tube, after cooling, having been broken, its contents are placed in a little water acidulated with sulphuric acid; sulphuretted hydrogen is evolved. If the quantity of sulphide formed is likely to be very small, nitro-prusside of sodium should be used as a test. Care should be taken that only small quantities of substances are operated upon in this manner, since some substances, as, for instance, realgar, orpiment, and others containing sulphur and arsenic at the same time, violently explode and detonate when ignited with those alkali metals.

The same process is available to organic substances. Substances like hair, feathers, dry skin, nails, etc., may be at once submitted to ignition with the metal. White of egg, emulsin, saliva, muscle and similar substances have first to be charred on pla-



tinum sheet, and the charcoal so obtained has to be ignited with potassium or sodium. In these cases nitro-prusside of sodium will be required to make the presence of sulphur absolutely evident. Zeitsch. f. Anal. Ch. 1869, 51, 53.

*Sulphurous Acid.* According to Stolba, a mixture of twelve parts of exsiccated protosulphate of iron and five parts of sulphur, when heated in a retort, yield readily and on a large scale sulphurous acid. Journ. f. pract. Ch. 99, 54 & 104, 467.

*Sulphuric Acid.* It is known that nitric and nitrous oxides form part of the atmosphere within the lead-chambers, the presence of the nitrous oxide being supposed to be due to the reduction of nitric oxide by means of the sulphurous vapor. Recent experiments of R. Weber, however, tend to show that the former gas results indirectly from the action of an excess of sulphurous acid upon nitrous and nitric acid in presence of water. Inasmuch as the formation of nitrous oxide involves a loss to the manufacturer, Weber recommends, as a means to obviate this decomposition, the constant presence of a certain proportion of sulphuric and nitric acids, in presence of which no reduction to nitrous oxide can take place. In some parts of the chambers, however, as, for instance, near the steam adits, the formation of some nitrous oxide cannot be prevented. Ann. Ch. P. 1868.

*Manufacture of Sulphuric Acid.* Lardani has devised a novel method and apparatus for the manufacture of sulphuric acid without large leaden chambers. The apparatus consists of a stove where the pyrites are burned. By means of a ventilator a draft of atmospheric air is continually blown into the stove, so that the oxidation of the sulphur goes on rapidly; the sulphurous acid gas passes into an apparatus for depositing sulphur and arsenious acid, then it passes into a cooler, discharging the wat ( vapor; afterwards it passes into that part of the arrangement where the conversion of the sulphurous into sulphuric acid takes place. This apparatus is divided into two parts; the lower one contains strong sulphuric acid covered with a layer of nitric acid; the upper one, separated from the lower by perforated leaden sheets, is filled with pieces of humid pumice-stone. The current of sulphurous acid gas mixed with atmospheric air passes

through the sulphuric acid and through the layer of nitric acid, and finally in the upper chamber through the pumice-stone, from whence the gases pass into a recipient for the reoxidation of the lower nitrogen oxides. This apparatus consists of a system of earthen pipes very much like the refrigerators of the gas factories; these are filled with pumice-stone or corks constantly kept humid by water.

The reaction of this process is obvious. The sulphurous acid by passing through the nitric acid oxidizes, the remaining lower oxides of nitrogen absorb atmospheric oxygen, forming nitrogen tetroxide, which is conveyed into the regenerator, where it, in contact with atmospheric oxygen and water, reoxydizes to nitric acid, and consequently circulates for perpetual utilization. Dingler's Polyt. Journ. 187, 521.

For the *detection of sulphurous acid and the lower oxides of nitrogen in commercial sulphuric acid*, Robert Warrington suggests the following test: About two pounds of the acid are placed in a bottle which the liquid half fills; the bottle is then stoppered and shaken. The gases contained in the acid are thus washed out by the atmospheric air contained in the bottle. The air in the bottle is then tested by the immersion of a slip of freshly prepared blue iodine-starch paper. The bleaching of the paper gives evidence of the presence of sulphurous acid.

The nitric oxides are detected by substituting for the first test-paper one imbued with iodide of potassium and starch. As NO forms  $\text{NO}_2$  on contact with air, and  $\text{N}_2\text{O}_3$  produces the same compound on contact with air and moisture, the presence of either of these three oxides will suffice to liberate iodine on the moist test-paper, and color the starch. Since sulphurous acid destroys the blue iodide of starch, the presence of an excess of this gas will prevent the detection of the nitric oxides. The nitric oxides are, on the other hand, without effect on the test-paper employed for the sulphurous acid. If this therefore is not in excess, it is possible to obtain the reactions of both gases from the same sample of oil of vitrol, and this is no uncommon occurrence with sulphuric acid which has been imperfectly boiled.

In using these reactions it is, however, to be remembered

that sulphuretted hydrogen produces with each the same effect as sulphurous acid. Ch. N. 1868.

A. Clemm suggests a method for the *volumetric estimation of sulphuric acid* which differs from those of R. Wildenstein and C. Mohr; the solution to be experimented upon is colored with litmus, and carefully neutralized; a solution of barium chloride of known strength is added in excess, and all the sulphuric acid thereby precipitated. Next, a titrated solution of sodium carbonate is added, in order to precipitate the excess of baryta; and next, again, the excess of soda solution used is estimated, volumetrically, by means of a titrated dilute sulphuric acid. During these operations no salt is formed which can injure the color of the litmus. In case salts be present in the original solution, the bases of which could be precipitated by sodium carbonate, that precipitation is performed previous to the addition of soda. The filtrate, which contains the sulphuric acid combined with sodium, is neutralized, and again volumetrically titrated. The solutions required for this test are:—a solution of barium chloride, containing 52 grms. to the litre of water, and a solution of sodium carbonate containing 26·5 grms. of this salt to the litre of water; a solution of sulphuric acid containing 20 grms. of hydrate of sulphuric acid to the litre of water. The great advantages of this method are the non-necessity for washing the barium sulphate and carbonate, and that titration does not take place in a fluid rendered turbid by suspended barium sulphate. Dingl. polyt. J., April, 1869.

*Hydrogen sulphide.* Boettger has instituted a series of experiments in order to ascertain the effect of sulphuretted hydrogen on a number of chemicals. A jet of this gas inflames by contact with the peroxides of manganese, lead and silver and with tetroxide of thallium. Many chlorates, iodates and bromates behave similarly. Other compounds occasion a violent explosion, among these acetylide and fulminate of silver and iodide of nitrogen. N. Rep. Ph. xvii, 468.

*Persulphide of hydrogen.* A. W. Hofmann has been investigating the constitution of persulphide of hydrogen, and has succeeded in rendering it certain that there is a persulphide

having the formula  $\text{H}_2\text{S}_3$ . When a cold saturated solution of strychnine in strong alcohol is added to an alcoholic solution of persulphide of ammonium, brilliant crystalline spangles soon appear, and, after twelve hours, the sides of the glass vessel are covered with orange-red needles which are obtained pure by washing with cold alcohol. They are insoluble in the common solvents. Analysis lead to the following formula,  $\text{C}_{21}\text{H}_{24}\text{N}_2\text{O}_2\text{S}_3 = \text{C}_{21}\text{H}_{22}\text{N}_2\text{O}_2, \text{H}_2\text{S}_3$ . In contact with sulphuric acid the crystals are decolorized, and, on adding water, colorless, transparent oily drops of persulphide of H are separated, which, after some time, are resolved into S and SH. This compound therefore splits according to the above formula.

Quinia, cinchonia, brucia and other alkaloids seem not to yield an analogous compound. Ber. d. deutsch. chem. Ges. 1, 81. A. J. Ph., May, '69, 238.

#### PHOSPHORUS.

In the *manufacture of phosphorus* on the large scale, M. Brison proposes to apply a furnace not unlike a blast-furnace as used for the reduction of iron ore. Through the mouth, which can be hermetically closed, coke and calcium phosphate are introduced, along with a sufficient quantity of a suitable flux to liquify the lime and the ashes of the coke. A blast-pipe, connected with a blowing engine, introduces a sufficient supply of air to keep the coke, when ignited, at a high temperature, while a tube plunging into a tank, filled with cold water, is intended to carry off the vapors of phosphorus set free; the slag is run off in a peculiar manner, somewhat akin to that in use with blast-furnaces at iron works, but so as to prevent phosphorus escaping. Ann. du gén civil. 1869, No. 5.

M. Baudrimont states, in the Compt. Rendus, that white phosphorus is neither a hydrate nor an allotropic state of ordinary phosphorus, nor does it result from devitrification of transparent P, but that it is ordinary phosphorus irregularly corroded on the surface by the action of the atmospheric oxygen dissolved in the water, which is accelerated by the action of light, and which ceases as soon as the water holds no more oxygen in solution.

When *phosphorus* is kept *under aqua ammoniæ* for some time it turns black, hard and brittle, so that it may be triturated to a powder. It does not inflame, and remains unchanged when kept in water. Exposed to the air it gives off some ammonia and gradually turns yellow, much like amorphous phosphorus. When laid into *aqua ammoniæ* it blackens again. Hag. Cent. H. 1869, 12.

The *solubility of Phosphorus in carbon bisulphide* has recently been determined by A. Vogel. This liquid dissolves 17 to 18 times its own weight of phosphorus without losing its liquid state. If such a saturated solution is left to stand in an open bottle, by evaporation of the solvent, it soon thickens to the consistency of goose grease. N. Rep. Ph. xvii, 449.

*Phosphorus* has lately been applied by W. Schmidt, as a *reagent for metals*. When its solution in carbon bisulphide is shaken with water, a white precipitate is formed. The presence of traces of metals caused the precipitate to assume various colors. Solutions of copper, for instance, render the precipitate brown; silver, black; oxide of mercury, yellowish-brown; gold, violet, etc. The filtrates contain generally suboxides.

*Dussart's method of detecting P*, is, according to Otto, not reliable when at the same time sulphur is present. The emerald-green phosphorus-flame, in such a case, will be disguised by the blue sulphur-flame. All sulphur, however, can be removed when the gas is previously conveyed through an U-shaped glass tube, which is filled with pumice-stone saturated with a concentrated solution of potassium hydrate.

Another source of error to which special attention has to be directed, is the liability of commercial zinc to contain traces of P. Arch. Ph., Jan. 1869, 173.

Schoenn suggests, for the *detection of phosphorus in inorganic substances*, to mix the perfectly dried powder of the substance with magnesium filings and to heat the mixture in a test tube. Phosphide of magnesium is formed, if P is present; when cool, a few drops of water are added to the fused mass, phosphorus trihydride gas is evolved and recognized by its peculiar odor; a sublimation of P and phosphorescence is sometimes



observed when the substances contain more than traces of P and when magnesium is used freely. The same test is applicable to organic compounds; they have, however, previously to be charred. *Zeitsch. f. anal. Ch.* 1869, 53.

A simple *apparatus* for the ready *detection of Phosphorus* in minute quantities, for the use of physicians, has been advised by Dr. Mueller. It consists of a glass flask of about 100 cubic centimetres capacity, closed by a cork which is perforated by a slender glass tube, at least 85 centimetres high, and three millimetres wide. Some of the contents of the stomach (or other suspected substance) is introduced into the flask, water is added, and the whole boiled. In the dark the slightest trace of phosphorus will immediately cause a lightning-like phosphorescence. *Berlin. klin. Woch. Sch.* 1868.

*Solvents of Phosphorus.* C. Méhu communicated to the Soc. de Ph. of Paris, the results of a series of experiments on the best means of preparing a reliable solution of phosphorus of definite strength for internal administration. Of all known solvents the author finds almond oil and cacao-butter the best and least objectionable. When properly prepared, oil of almonds retains one-eightieth of its weight, (1.25 per cent.) P in solution without crystallizing. Prepared with one-seventieth some crystals are finally deposited. Such an oil is phosphorescent in the dark; this phenomenon ceases not before the oil is so much diluted that one part of phosphorus comes to 500 parts of oil. The phosphorescence, however, is interrupted by the addition of a number of substances, as, for instance, ether and many hydrocarbons, as the oils of turpentine, bergamot, lemon, lavender, mace, mustard, rosemary, mint and thyme. *Lond. Ph. J.*, March, 1869, 541.

Observation and experience seem to evince that the vapor of oil of turpentine is an effectual *antidote against and preventive* of the injurious effect of *phosphorus vapor* on the laborers in match factories. *Arch. Gén. de Med.*

*Phosphoric acid.* Prof. Wöhler has suggested a good method of separating phosphoric acid from bases. It consists in dissolving the substances to be analyzed in a small quantity of

nitric acid and adding to the solution, first, argentic nitrate and afterwards its carbonate. When shaken, all phosphoric acid combines with the oxide of silver and is precipitated, whilst the bases remain in solution and may be freed from the excess of silver by means of hydrochloric acid.

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## MONAD METALS.

### POTASSIUM.

*Potassium Chlorate.* Lange published in the Polyt. Centr. Bl. 1868, 1515, a rational method for the manufacture of the potassium chlorate which is an improvement over the usual method, as it conveys the chlorine gas into hot milk of lime. Calcium chloride and calcium chlorate ensue, which latter one is transformed into the corresponding potassium salt by means of potassium chloride.

*Potassium Perchlorate* of commerce contains frequently considerable quantities of the chlorate. Rabuteau suggests the purification of such salt by treating it repeatedly with a mixture of equal parts of hot hydrochloric acid and water. When the liquid ceases to decolorize indigo-solution under the influence of some sulphurous acid, the salt is separated from the liquid and is repeatedly washed with hot water in order to remove the potassium chloride. The result is completely pure potassium perchlorate. N. Rep. Ph. xviii, 43.

*Potassium Nitrate* of commerce, according to Boettger, contains notable quantities of potassium nitrite, originating probably from the sodium nitrite contained in all crude soda salpeter. Since potassium nitrate is usually prepared from this last named salt by decomposition with potassium chloride, the nitrite remains mixed with it in consequence of insufficient recrystallisation. N. Jahrb. Ph. 1868, 570.

*Potassium Permanganate.* Stædeler recommends, in the manufacture of potassium permanganate, the use of chlorine instead of hydrochloric acid as oxidizing agent; he devises the following method of operating: The crude pulverized manganate is exposed with its own weight of water for several days, then a

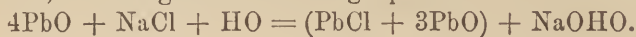
similar quantity is added, and a current of chlorine passed through the liquid until it becomes red ; the solution is frequently agitated, diluted with four times its volume of water, filtered and reduced to one-fifth of its original volume. At this point the permanganate crystallizes ; it can be purified by recrystallization. The yield is 90 per cent. of the weight of the manganic dioxide employed. Zeitsch. f. Anal. Ch. vii, 467.

It is well known that potassium permanganate readily gives off part of its oxygen, and that its medical and pharmaceutical application and compounding have to be directed accordingly. In solution it ought to be administered, if possible, without the addition of organic or reducing substances. Most of them not only change the permanganate and disqualify it in its intended therapeutical effect, but some give rise to violent reactions even in diluted solutions, as glycerin for instance.

*Potassium Bitartrate.* The Zeitsch. f. Chem. No. 5, 1869, contains the following method to analyse crude cream of tartar : One grm. of the dry and powdered sample is heated to redness in a tared porcelain crucible until the contents are in igneous fusion ; the weight of the residue found after cooling may be called p. The crucible and contents are next boiled in distilled water, the fluid decanted from the sediment is set aside and the latter washed until the wash-water no longer turns red litmus blue ; the insoluble residue is dried. Its weight may be called r ;  $p-r$  is equal to the soluble portion of the ash, which represents the potassium carbonate. When the result of  $p-r$ , expressed in grammes, is multiplied by 271, the percentage of pure potassium bitartrate is obtained contained in the sample of the crude tartar ; when the result of  $p-r$  is multiplied by 216 the percentage of crystallized tartaric acid is obtained. Ch. N. A. R. July, 1869, 37.

#### SODIUM.

*Sodium Monoxide.* Bachel's process for the manufacture of caustic soda is, according to the Annal. du Génie Civil, April, 1869, the following : When litharge, chloride of sodium and water are mixed together, oxichloride of lead is formed, and soda set free, according to the following equation :



The oxychloride of lead thus produced being treated with milk of lime, chloride of calcium is formed, and oxide of lead reproduced according to this equation :



The operation, therefore, consists in making oxide of lead act upon common salt, exhausting the soda thus formed by washing out with water and evaporating the alkaline fluid. The oxychloride of lead being insoluble, is placed in a suitable apparatus, and mixed therein with lime water, whereby the oxychloride is re-converted into protoxide of lead. The calcium chloride obtained as by-product is, however, at present almost entirely valueless. Ch. N. A. R. July, 1869, 40.

*Sodium Carbonate.* C. Kessler suggests a novel method for the manufacture of soda. A mixture of common sodium chloride and chromic oxide is heated to redness and afterwards steam is admitted. The water is decomposed ; its oxygen combines with the sodium, sodium bi-chromate being the result, whilst the hydrogen and chlorine form hydrochloric acid, which is conveyed into and absorbed by water. The bichromate thus obtained is now calcined in contact with charcoal on the hearth of a salt-cake furnace, just as in Leblanc's process. Sodium carbonate and chromic oxide result, from which mixture the soda is easily obtained by water. The chromic oxide can anew and permanently be used for the same operation. A considerable advantage of this method is that the formation of the objectionable sulphides and oxysulphides is avoided. Deutsch. Ind. Zeit. 1868, 148.

*Sodium Arseniate* has been obtained by fusion of sodium nitrate with arsenious acid, which decompose under evolution of gases containing arsenic. Th. Werner suggests the following method of its preparation, whereby no poisonous gases are evolved. A warm solution of sodium hydrate is saturated with arsenious acid, then sodium nitrate equal to three quarters of the quantity of the arsenious acid is dissolved in some boiling water and added to the first solution ; the whole is evaporated to dryness and fused in a crucible. The gases evolved are mainly nitrous oxide ; they are destitute of any arsenic. Ph. Zeit. Russl. July, 1868.

(A simple mode for the preparation of sodium arseniate would be to oxidize arsenious acid in a porcelain dish, by means of nitric acid, to evaporate to dryness in order to remove any excess of nitric acid, and to neutralize with sodium carbonate).

*Sodium Hypochlorite.* By substituting a solution of sodium bicarbonate for one of carbonate in the preparation of Javelle water, a precipitate of carbonate of lime is obtained in the form of a crystalline powder, depositing itself easily, whilst, when a solution of ordinary carbonate of soda is employed, a precipitate is formed, which is difficult to separate perfectly from the liquid by decantation. A small excess of the bicarbonate is just as advantageous as in the case of carbonate. Journ. de Ph. et de Ch. 1868.

*Sodium Chloride.* Messrs. Bald and Mactear read before the Chem. Sect. of the Glasgow Phil. Soc., a memoir on the great salt deposits in the North German basin, whose most celebrated mines are at Stassfurt, Prussia. These deposits present an almost inexhaustible field for study and research. The basin covers an area of more than 120 square miles, filled with new red sandstone; it is interspersed by elevations of gypsum. In the one mine, after passing through 27 feet of alluvial soil, 576 feet of new red sandstone are reached, then 213 feet of gypsum, anhydride, and marl, the salt deposits beginning at a depth of 816 feet. In another mine, half a mile distant, the sandstone is entirely wanting, the salt strata being reached at 480 feet, after passing through 20 feet soil and 460 feet of gypsum, anhydride and marl.

The total thickness of the salt deposits is 1,197 feet, and this may be said to consist of:

This gives a composition of:			
Rock salt	. .	989 feet.	Sodium chloride . . 85.82
Anhydride	. .	36 "	Potassium chloride . . 1.67
Corrallite	. .	98 "	Magnesium sulphate . . 4.70
Kieserite	. .	51 "	Calcium sulphate . . 4.88
Polyhalite	. .	13 "	Magnesium chloride . . 2.53
Hydrated mag. chl.	13 "		Potassium sulphate . . 0.40
<hr/>			
			100.00



Besides their scientific interest, these vast salt deposits with their excellent mines have a considerable interest in the political economy of industry and commerce, since they are an almost inexhaustible supply for the modern chemical industry. Ch N. A. R. April, 1869, 178.

*Origin of Rock Salt.* The large sites of rock salt at present known belong to either secondary or tertiary formations; those of the Devonian and Silurian deposits appear to have been formed by the evaporation of then existing seas, by the action of the heat of the interior of the globe. The saline deposits and beds of gypsum of the triassic period are neither due to evaporation nor sublimation, and appear to have been rather formed by saline waters, saturated solutions of salt, from springs, running into the then existing seas, and causing such a supersaturation as to bring about a deposit of chlorides and sulphates. The saline springs, salt springs of the cretaceous period, may be the result of fresh water which has become saturated with salt while traversing deeper lying beds thereof, and being afterwards forced up by hydrostatic pressure. It may be said that a continuous diminution of sea-water has been taking and is actually taking place, from the first existence of a sea on our globe, either by chemical action or by infiltration. Dr. A. Boné, in *Les Mondes*, June 10, 1869.

#### AMMONIUM.

*Liquor Ammoniacæ.* C. Rehsteiner instituted comparative experiments in order to determine the delicacy of Bohlig's method to detect the quantity of ammonia contained in waters by means of mercuric chloride and potassium carbonate, and that of Nessler, (mercuric biniodide in solution with potassium iodide and potassium hydrate). The experiments with exactly titrated ammoniacal waters, proved in favor of Bohlig's reagent. This gives a white precipitate with a water containing  $100.000$  ammonia, a white turbidity after a few minutes with a water containing  $500.000$  ammonia, and still yields a visible reaction after five minutes, when a water contains but one-millionth part of ammonia.

Nessler's test does not react with waters containing less than  $500.000$  ammonia. *Schweiz. J. Ph.* 1868, 112.

*Diammoniac Carbonate*, or normal ammonia carbonate, has not yet been obtained in a solid state. E. Divers succeeded in preparing it by maceration of the commercial ammonia carbonate in liquor ammoniæ; the remaining undissolved mass is the diammoniac carbonate; by introduction of some free ammonia gas, all is dissolved. Then some new carbonate is added and its solution is accomplished by heating the whole. When cooling, the whole mass becomes filled with diaphanous crystals, which are collected and quickly dried upon unsized paper. This diammoniac carbonate forms shining needles, readily soluble in water and in about 70 parts alcohol. They decompose readily in the air, evolving ammonia gas and finally leave a powder of mono-ammoniac carbonate, the so-called bicarbonate. N. Rep. Ph. 18, 179.

*Mono-ammoniac Carbonate*, the so called ammonia bicarbonate, which is formed in considerable quantities on the sides of casks in which the commercial ammonia-sesquicarbonate is imported, is recommended by W. Procter, Jr., as a reliable remedy in certain gastric affections, and as a good antacid. A. J. Ph., July 1869, 294.

*Ammoniac Pyrogallate* is obtained in small white crystals when a solution of pyrogallic acid in ether is saturated with ammonia gas. Hager Centr. H., 1869, 10.

*A novel very delicate reagent for alkalies, particularly for Ammonia.* Prof. Böttger recommended, some time ago, the coloring principle of *Coleus Verschaffelti* as a delicate reagent for alkalies. More recently, he ascertained that the extract from the alkanet root surpassed in delicacy all known reagents for this purpose. It is used by saturating paper with a diluted alcoholic solution of the extract; before use the paper is moistened with distilled or pure water. Alkalies, and particularly ammonia, turn the red color into blue.

#### SILVER.

*Argentio Dioxide* is formed, according to F. Wöhler, on the silver plate at the positive pole of a Bunsen's battery, when the electric current is made to pass through water acidulated with sulphuric acid, or through a solution of sodic sulphate. Goettinger Nachrichten. 1869, 139.

Prof. Stas suggests a modification of Gay-Lussac's method of *estimating silver in the wet way*, who employs a standard solution of sodium chloride; but since the precipitated silver chloride is soluble in a solution of salt, it is impossible to carry out this principle to the minute accuracy which is frequently required. Stas has now discovered that, by substituting a bromide for the chloride in precipitating silver, this error may be entirely removed.

*Argentio Chloride.* According to Graeger, an ammoniacal solution of argentic chloride is completely reduced by placing therein lumps of zinc in excess and frequently shaking. When the fluid, on a drop thereof being tested, no longer yields a precipitate with hydrochloric acid, the operation is finished; the silver is then separated by pouring the fluid off from the spongy mass, and washing by decantation; the pieces of zinc having been removed, the spongy silver is washed with pure, strong hydrochloric acid, and next with water. N. Jahrb. Ph. xxix, 10.

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## DYAD METALS.

### BARIUM.

Among recent mineral discoveries along the Apalachian section of the Atlantic coast are deposits of Barium-compounds. A. D. C. Sept., 1868, 241.

### CALCIUM.

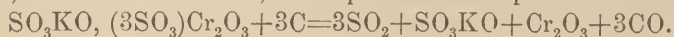
*Calcium Carbonate.* For the preparation of pure calcium carbonate, Graeger suggests the following process: Calcium hydrate is digested with so much of a solution of ammonia nitrate that the former is in excess; after a time the solution is filtered; the filtrate is a solution of pure calcium nitrate with some free ammonia hydrate; if washed carbonic acid is passed through the solution all the lime is precipitated, which process may be made perfect by the final addition of some ammonia carbonate. The precipitate is washed and dried. N. Jahrb. Ph. 29, 158.

*Calcium Phosphate.* Dusart and Pelouze state that gelatinous calcium phosphate, when kept in water saturated with carbonic acid, absorbs this gas, and thereby loses one equiv.  $\text{CaO}$ ,

its constitution and formula being changed to  $2\text{CaO}$ ,  $\text{HIO}$ ,  $\text{PO}_5$ ,  $5\text{HIO}$ . This calcium phosphate is a white granular crystalline body, slightly soluble in water, (28 : 1000) but more soluble in water charged with carbonic acid. Ch. N. A. R. Sept., 1868,

#### ALUMINIUM.

*Chromium Alum.* The manufacture of aniline green and violet, and of valerianic acid, give abundant residues of this alum. They cannot be used as mordants, because, when calcined, they are insoluble in water. M. F. Jean found that when chromium alum, previously mixed with three equivalents of carbon, is heated to redness, decomposition takes place as follows :



If, on the other hand, chrome alum be decomposed with seven equivalents of carbon, the evolution of sulphurous acid is less than in the first case, and the mass taken up by the water yields potassium sulphide and hyposulphite; the chromium sesquioxide obtained under these conditions must be separated, by washing with acidulated water, from chromium sulphide, formed by contact with the potassium sulphide.

It is, however, better to decompose the alum with three equivalents of carbon than with seven, because the decomposition is quicker and purer. Comp. rendus, 1868.

#### ZIRCONIUM.

The German chemist Klaproth discovered, in 1789, a metallic oxide in a mineral brought from Ceylon, and occasionally cut and polished as a gem. As this mineral had long been known under the name of zircon, the new earth received the name zirconia. The same oxide was likewise found in the stone known as "hyacinth." About three years ago Prof. Church examined zircons under the micro-spectroscope, and observed that some of them exhibit peculiar absorption bands, not given by zirconium silicate. Mr. H. C. Sorby, not knowing of Church's observation, and engaged with the examination of Ceylon zircons, found that the luminous spectrum is traversed by more than a dozen well defined, narrow, black lines. As these absorption bands are not given by any other substance, Sorby regards

them as indicating the presence of a new earth associated with zirconium, and as they are exhibited chiefly by those pale colored varieties of zircon, which are known as jargon, he proposes to name the new metal jargonium, while Church has suggested for this supposed element the name of nigrium. It would appear, from Sorby's further research, that the earth jargonium is capable of existing in two allotropic conditions, having different densities and optical properties. Ch. N. A. R. March—June, 1869.

#### LANTHANUM.

Since the determination of the atomic weight of this element has only been derived from the barium sulphate obtained from lanthanum sulphate, and since it has been found that this method is incorrect, in consequence of there being precipitated, with the barium sulphate, undecomposed lanthanum sulphate, W. Casseimann has estimated the correct quantity of sulphuric acid which combines with lanthanum oxide, by means of ignition. From a long series of experiments, which agreed, he has deducted the atomic weight of lanthanum to be 45, and that of its oxide 53. Zeitsch. f. anal. Ch. 1869.

#### MANGANESE.

*Manganous Sulphate.* C. J. Rademacher suggests, for the preparation of pure  $\text{SO}_4 \text{ Mn } 7\text{OH}_2$  from the crude salt, the following successive transformation: The sulphate is decomposed by sodium carbonate, the manganese carbonate is redissolved in acetic acid, the solution treated with sulphhydric acid, heated, filtered and again decomposed by sodium carbonate; the manganese carbonate is finally dissolved in diluted pure sulphuric acid. If copper only is present it is not necessary to convert the manganese into acetate, since copper is precipitated from the sulphate. A. J. Ph. May. 1869, 216.

For the preparation of the manganous sulphate from the liquid remaining after the generation of chlorine, F. Mahla suggests the following method: The liquid is supersaturated with sodium carbonate, the precipitate is washed, and then three-fourths of it are dissolved in a sufficient quantity of diluted sulphuric acid. The solution is heated to near its boiling point and then



the reserved one-fourth of the precipitate is gradually added until the liquid, after filtration, ceases to yield a black color on addition of gallotannic acid solution. The solution is then crystallized. In case the first crop of crystals contains some calcium sulphate, owing to the presence of calcium carbonate in commercial peroxide or manganese, the pure sulphate is obtained by evaporating to dryness, redissolving in some water, when the less soluble calcium sulphate remains behind. Chicago Pharm. March, 1869.

#### ZINC.

The well-known method of *purifying metallic zinc* by melting with sulphur has been improved by Gunning's suggestion to pack the zinc in the crucible with alternate layers of a mixture of sulphur and dehydrated sodium carbonate. N. Tijdschr. voor de Ph. in Nederl. 1866, 56.

*Zinc Phosphide* has been introduced as a new mode of administering phosphorus by M. Vigier, of Paris. It is prepared by passing the vapor of phosphoretted hydrogen over zinc heated to redness. The gas is evolved from phosphor-calcium by means of hydrochloric acid. It is thus obtained either crystalline or spongy, or fused, but always of the composition  $PZn_3$ . Experiments made with this compound by Proust and Dujardin show that the phosphorus retains but half the poisonous effect it possesses in the pure state. N. Rep. Ph. xviii. 287—293.

#### MERCURY.

*Detection of Mercury in Poisoning cases.* L. A. Buchner employed the following method when searching for mercury in the remains of a person poisoned by corrosive sublimate. After the organic remains have been disintegrated by a hot mixture of potassium chlorate and chlorhydric acid, the solution is diluted and saturated with sulphhydric acid. After the lapse of some hours, the sulphide formed is collected, dissolved in aqua regia, and reduced by evaporation to a small volume. A little water being added, a bright piece of copper wire is placed in the liquid, and when mercury is present the wire becomes grey, at the latest, in two days. The copper is withdrawn, dried and heated in a wide test tube. The mercury is more easily distinguished

by removing the wire, and placing in the tube a drop of tincture of iodine. N. Rep. Ph. xvii. 386.

L. Riederer instituted a series of experiments for the purpose of studying the physiological effect of mercury upon the animal system, and to establish the *accuracy of the usual methods for the detection of mercury in the animal organism*. Having remarked that the mercuric sulphide which is formed in the above process of Buchner always contains organic matter, he applied dialysis in the following mode: After disorganization with potassium chlorate and chlorhydric acid, the mercury in solution is precipitated by sulphhydric acid, the sulphide collected dissolved in a mixture of potassium chlorate and hydrochloric acid, and dialysed with 500 c. c. of water; at the end of five days the water is evaporated and the dialysis repeated. After this treatment the solution is again saturated with sulphhydric acid; the precipitate is washed with ammonia and ammonium sulphide, then with weak nitric acid, and finally treated afresh with chlorhydric acid and potassium chlorate.

Operating upon dogs with calomel, L. Riederer has recognized that the greater part of the mercurial compound is eliminated by the excrements, and that of the rest, more collects in the liver than in the muscles. N. Rep. Ph. xvii. 237.

*Mercuric Oxide*, as usually assumed on the authority of H. Rose, will displace only such bases out of their chlorides which do themselves not precipitate the oxide or oxychloride. M. Fonberg states, in the *Annal d. Chim. et Ph.* 1868, that the chlorides of the alkalies and the alkaline earths are also acted upon when shaking or boiling their saturated solutions with mercuric oxide.

*Mercurammonium-chloride*. Prof. Attfield, in a communication to the Brit. Pharmac. Conf., states that on examining six specimens of white precipitate in reference to their volatility, fusibility and percentage of mercury, he found them all volatile, but only one fusible, and their percentage of mercury varying from 72 to 76.59, while the theoretical proportion is  $79\frac{1}{2}$  per cent. Attfield attributes this deficiency to the fact that the commercial white precipitate is not sufficiently washed from the ammonium chloride, and suggests that the pharmacopœias, in

order to exclude impure mercurammonium-chloride, or such containing undue proportions of ammonium-chloride, ought to insist upon the character of volatility as well as upon a percentage of not less than 78 per cent. mercury. London Ph. J. March, 1869, 515.

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## TETRAD METALS.

### LEAD.

Boettger states that the *action of water on lead* seems to be due mainly to the presence of ammonium carbonate in the water, and not, as is usually ascribed, to the air and carbonic acid dissolved in the water. The author states further that the alloying of the lead with a small amount of tin protects the former from being acted upon, and this fact suggests the advantage of introducing a little tin into the metal from which lead piping is to be manufactured. Dingler's Pol. J. 1868.

*Plumbic Monoxide.* Commercial litharge contains, not unfrequently, metallic lead to the amount of six per cent. A. Vogel confirmed Hartmann's suggestion (N. Jahrb. f. Ph. 30, 172,) that by simple levigation the whole amount of lead can be removed. N. Rep. Ph. xviii, 22.

*Plumbic Carbonate.* A. Girard has recently invented a new process for the manufacture of white lead. The granulated lead is placed in a rotating cask with one-fourth of its weight of pure water. The cask is made to rotate at the rate of thirty or forty turns a minute, and arrangements are made for the passage of a current of air during the rotation. After about two hours, nearly the whole of the lead is found to be oxidized, and then carbonic acid is introduced in the place of the current of air, and the rotation continued for four or five hours further. At the end of this time nearly the whole of the lead is found to be converted into hydrated carbonate, which can be separated from the metal by decantation. Ch. N. A. R. Sept., 1868, 149.

### IRON.

"*Heaton's Steel and Iron Process*" is the title of a comprehensive essay in the Chem. News A. R. April, 1869, on the

present state of the modern steel manufacture, and of the latest experiments about this important subject. The great interest in Heaton's process is proportionate with its scientific and commercial object—the production of good steel and wrought-iron from impure pig-iron. The use of crude pig-iron is the chief point which distinguishes Heaton's method from all old and modern steel processes, since these all require the employment of pure iron, or iron ore free from phosphorus and sulphur. This requirement much limits the application of Bessemer's valuable process. Heaton's process, as is well known, differs from Bessemer's in employing sodium nitrate as the oxidizing agent, instead of atmospheric air; it would afford a great success if it were found to come fully up to what its advocates assert, but what has still to be established by experience and more extended application.\*

It is the same with Ellershausen's recent suggestion, to convert crude cast-iron into wrought-iron by the simple admixture of pulverized iron ore during the smelting, whereby carbon and the impurities are oxidized and removed, as in the puddling process.

*Iron Oxides.* Solutions of the various hydrates of the ferric oxides are, as is well known, liable to gelatinize. Hager is inclined to account for this reaction by the presence of slight quantities of manganese. Centr. Halle, ix, 287.

*Hydrated Iron Oxides by Dialysis.* The so-called soluble hydrated ferric oxides were first introduced by St. Gilles, and by dialysis, in 1861, by Thos. Graham. Since then they have continually been the subject of numerous researches and studies, and have given rise to quite a literature about the subject, the principal contributions being from St. Gilles, R. Wagner, Grosinger and Hager. These labors, running through a number of years, are very extensive, not seldom contradictory, and leave the whole subject, in some points, a still open question.

Among the noteworthy publications during the last few years, Hager's "on the nature of the dialyzed ferric oxides" is the most interesting. The formula of the dry dialyzed ferric oxide is  $\text{Fe}_2\text{Cl}_3 + 12\text{Fe}_2\text{O}_3 + 3\text{HO}$ ; when exsiccated on glass it forms dark brown scales, readily soluble in water, which quality they

lose more or less by warming. The solution is dark brown, tastes but slightly styptic, and does not change when exposed to air and light. With argentic nitrate it yields only a slight reaction. The hydrates and carbonates of the alkalies precipitate the hydrated ferric oxide, which reaction is, however, prevented by a previous addition of sugar. Acetic and arsenious acids mix with the solution, while the other common acids, concentrated as well as diluted, form yellow or brown precipitates, which, however, seem to be composed in accordance with the above formula, since they, like the soluble ferric ferrocyanide, redissolve as soon as the acid has been washed out. Ammonium sulphhydrate precipitates the iron completely in the form of ferric sulphide.

*Dialyzed Ferric Oxide* in the dry as well as in the dissolved state are valuable iron preparations in medicine, but their application as an antidote in cases of poisoning with arsenic cannot be considered legitimate before their effect in this respect has fully been established. As has been mentioned, arsenious acid mixes with the iron solution without any reaction, and the precipitate produced by arsenic acid contains hardly any arsenic acid, so that this mainly remains in solution. Dialyzed ferric oxide, when used as an antidote to arsenic, has therefore first to be precipitated by ammonia solution. Hager recommends for this purpose experiments with a mixture of magnesium hydrate with a solution of dialyzed ferric oxide.

Hager succeeded to prepare from the officinal concentrated liquors of ferric chloride, ferric acetate, etc., by careful precipitation with ammonia and subsequent solution in some of the iron liquor, avoiding any warmth, a modification of iron analogous in every respect to the dialyzed ferric oxide. Centr. H., ix, 217.

*Saccharated Ferric Oxides.* Recently the so-called saccharates of iron have attracted much attention; they are prepared in the dry state as well as in the liquid form. The formula for the latter was first published by H. Hager, (Ph. Cent. Halle viii. 37); Wittstein analyzed and published the formula of Fleischer (Viertelj. Sch. pract. Ph. xvi. 211). This syrup of saccharate of ferric oxide is not of novel date; it has been known for more than twenty-five years as a French secret medicine, whose



formula is given as "sirop ferreux du Docteur Dusourd in Dorvauld's l'officine, septième éd. p. 492.

The method of the preparation of the saccharated ferric oxide is given by S. Siebert in Pharm. Cent. H. 1867, No. 41, and in Am. J. Ph. July, 1869, 324. More recently Drs. Köhler and Hornemann (Berlin. Klin. Wochenschrift, 1868, N. Rep. Ph. xviii, 36, A. J. Ph. July, 1869. 326) have suggested a method whereby a modification of hydrated ferric oxide of iron is obtained readily soluble in sugar solution and in glycerin. Equal weights of a solution of sesquichloride of iron, containing 15 per cent. iron, and simple syrups are mixed, sodium hydrate is then added until the precipitate is redissolved, the filtrate is mixed with a large quantity of water, and boiled for some time. The presence of the neutral sodium chloride is sufficient to precipitate the hydrated ferric oxide in its soluble modification. The precipitate is collected upon a filter, washed until the filtrate ceases to react with argentic nitrate, dissolved with powdered sugar, the solution evaporated to dryness and the residue reduced to powder.

This preparation is readily soluble in water without any styptic taste and without being changed by boiling. It is chemically very indifferent, not precipitated by any of the common reagents for iron, except by ammonium sulphide and gallo-tannic acid. But the addition of neutral salts gradually separates the entire quantity of the hydrated ferric oxide; by dilution and boiling the effect is produced instantly. The acids transform this soluble modification into the common hydrated ferric oxide under decoloration and with its usual reactions.

Since this preparation has no styptic taste, it can be administered in milk, soups, coffee, and other convenient kinds of food. Its pretended reliability as an antidote to arsenic requires more extended experiments and experience.

The chemical nature of this ferric oxide has been established by Hager, (Ph. Cent. Halle 1869, 203.) He found that pure hydrated ferric oxide is completely insoluble in sugar and in glycerin, and that the composition of this modification of ferric oxide, believed to correspond to the formula  $\text{Fe}_2\text{O}_3 + 6\text{HO}$ , is not correct. Hager proves that the solution of all these saccharated

ferric oxides are due and solely depend upon the presence of some hydrated alkali, which is in Köhler and Hornemann's preparation potassa and in Siebert's ammonia.

*Ferrous Oxalate.* A. Vogel, in 1855, suggested a method for obtaining ferrous oxalate by decomposition of ferrous sulphate with oxalic acid. Schaeffer and Moore published the same process in the Am. J. Ph. xvi. In the same year Vogel called attention to the loss by this method, inasmuch as the sulphuric acid which is set free, keeps in solution nearly half the amount of the ferrous oxalate; he recommends, therefore, to dip metallic iron into the filtered solution, whereby all the oxalate is precipitated, whilst the original quantity of ferrous sulphate is restored. This method is also approved by Reynolds. London Ph. J. viii, 422.

The ferrous oxalate, when subjected to ignition, furnishes a polishing material equal to the best emery. Wigg. Jahr. ber. 1868, 227.

*Ferric Pyrophosphate.* The process of the U. S. Pharm for this preparation gives often a magma which scales but imperfectly; Dr. S. P. Duffield succeeded in preparing it so that it always scales very well. His modification of the official process is this:—the magma obtained from  $8\frac{1}{2}$  ounces of sodium pyrophosphate is digested with one pint ammonia solution for six to eight hours; then six ounces citric acid, dissolved in two pints of water, are gradually added until the ammonia is neutralized and the precipitate is dissolved. After filtering and evaporation, the syrupy liquid is spread on glass and scaled. The chemical difference of the result is, that in the process of the Pharmacopœia the iron is pyrophosphate, while in Duffield's it is probably the ferric citrate. Proc. A. P. Ass. 1868, 403.

*Sodium and Ferric Pyrophosphate* is obtained by mixing a solution of 8 oz. sodium-pyrophosphate in 14 oz. water to a solution of 11 drams ferric-chloride solution of 1.526 spec. gr. and 6 oz. water. The precipitate which ensues redissolves. An equal volume of alcohol is then added to the solution, whereby the sodium and ferric pyrophosphate is precipitated as a white crystalline powder, which is collected, washed with alcohol and dried. Hager. Centr. H. 1869, 14.

*Ferrous Iodide in scales* is obtained by preparing a concentrated solution of ferric iodide from 2 parts iron, 8 parts iodine, and 15 to 20 parts water.

The solution is filtered into a thick mucilage, prepared by evaporation of a solution of 5 parts sugar and 75 parts gum arabic. The mixture is now further evaporated to the consistency of an extract, spread on warm glass plates and dried. The scales contain 10 per cent. ferrous iodide. Hager. Centr. Hal. 1868, 296.

*Ferrous Sulphate.* M. Welborn states that protosulphate of iron is absolutely preserved and kept from even the least trace of oxidation, by placing with it a piece of camphor, or by wrapping it in a piece of clean and dry paper. Deut. Ind. Zeit. 1869.

#### NICKEL.

Nickel sulphate, in a communication to the Richmond Medical Journal is recommended as a valuable sedative, producing sleep where Dover's powder and other opiates are contra-indicated. A. J. Ph. Nov., 1868, 376.

#### COBALT.

*Estimation of Cobalt in the presence of Arsenic.* The method for the volumetric determination of cobalt in presence of nickel is, as well known, inapplicable in cases where oxygen compounds of chlorine, sulphur, arsenic and phosphorus are present. This method, proposed by Winkler, consists in first mixing with the solution to be tested mercuric oxide, and then adding a standard solution of potassic permanganate. The injurious action of arsenic and phosphoric acid may, however, be avoided by precipitating them as arseniates and phosphates of iron, by adding a proportionate quantity of pure ferric chloride, an excess of which is removed from the solution by the subsequent addition of mercuric oxide. Sulphuric acid is removed by means of baric chloride. Zeitsch. f. anal. Ch. vii, 47.

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### PENTAD METALS.

#### ANTIMONY.

Prof. Attfeld states that *metallic antimony reduces ferric to ferrous salts*, the antimony becoming dissolved by the influence of the excess of acidulous radical contained in the ferric salts over

and above its amount in the corresponding ferrous salts; that, therefore, in precipitating antimony by iron, and in order to separate it from tin and with the view of quantitatively estimating the antimony, air must be excluded until all ferrous salt is washed away. London Ph. J. March, 1869, 512.

*The antidotes of antimony*, especially of tartar emetic and butter of antimony have been the object of study by R. Bellini. For the former the hydrates of ferric sulphide are suggested as the best antidote, since they completely precipitate antimoniates. Sulphhydic acid solution acts equally well, but is objectionable on account of its repugnant qualities.

Gallo-tannic acid and decoctions of vegetable substances containing this acid do not precipitate completely the antimony, and the antimonious tannates are not entirely insoluble in the animal system.

As antidotes to the trichloride of antimony, Bellini recommends albumen, vegetable gluten, magnesium hydrate and alkaline solutions which combine with the antimony as well as with the acid. Gallo-tannic acid as well as sulphhydic acid are objectionable because they only bind the antimony, leaving free the acid; hydrated ferric sulphide is also objectionable.

For the discharge of antimony retained in the system, Bellini recommends the use of tartaric acid, cream of tartar, citric acid, and lemon juice, by which the insoluble antimoniates are transformed into soluble ones. Viertelj. Sch. f. Ph. 18, 140.

In an examination into the *action of iodine on the hydrogen compounds of antimony and arsenic*, M. Husson has discovered a reaction which may furnish a useful application in toxicological researches. He finds that antimonious and arsenious hydrides form the corresponding iodides when the gases are made to pass over iodine. A tube containing a small piece of iodine being joined to the Marsh's apparatus, gentle heat is applied to volatilize the iodine, which, upon condensation, lines the tube. Then, while the tube is still warm, the gas is allowed to pass. If this contains arsenious hydride, the iodine will be bordered by a yellow line formed of little straw-like masses, having much analogy with iodoform; the iodine disappears completely. With antimonious hydride the reaction is less manifest; all the iodine

collects forming a deep orange- or brown-tinted ring. But the action of heat enables these two iodides to be distinguished thus: the yellow arsenious iodide is transformed, one part into red iodide with disengagement of iodine, the other volatilizes in the state of yellow vapors, which are received on unsized paper; the same phenomenon is produced under the influence of an excess of arsenious hydride, whence M. Husson is inclined to conclude that an arsenious periodide is first produced. Antimonious iodide, on the other hand, evolves red vapors, and leaves a little reduced antimony. *Quart. Sci. Rev.* Jan., 1869, 106.

*The Sulphates of the Antimonious Oxide* have been the subject of a series of studies by W. P. Dexter. Based upon the recent researches of Schultz and Peligot, and the earlier investigations of Brandes, W. P. Dexter, searching for the composition and constitution of those sulphates, succeeded in obtaining a series of antimonious sulphates sufficiently pure for analysis. These salts (bisulphate, tersulphate and the basic sulphates) are all crystalline, dissolve readily in hydrochloric acid, and with the exception of the disulphate, are decomposed by the action of water. The basic sulphates form a series of salts in which the oxide is united with two, one, and half an equivalent of acid. Besides these there appear to be others, which seem to be combinations of these simple salts. They occur under various conditions; but the degree of dilution of the acid seems to have the greatest influence in their production. The series of the antimonious sulphates resembles those of the oxides of glucinum and zirconium considered as sesquioxides. The neutral sulphate of neither of these earths combines with hydrate of sulphuric acid to form an acid sulphate. From bismuth the antimony series differs in that the salts of the former metal are decomposed by water and that bismuth oxide appears to form one, if not two, acid sulphates. *Amer. Journ. Sci.* 1868.

*Antimonious Trichloride and Trioxide* (Algaroth's powder) is obtained, according to L. Schæffer, by heating in a sealed vessel three molecules of alcohol with one molecule of antimonious chloride to  $150^{\circ}$  C. By heating one molecule of alcohol with one molecule of antimonious chloride to  $160^{\circ}$  C., the compound  $\text{SbO}_2\text{Cl}$ , chloride of antimonyle, also in the crystalline state, is formed.



The latter is insoluble in alcohol or ether; water slowly decomposes it to oxychloride and chlorhydric acid. Ber. d. Deutsch. Ch. Ges. 1868, 81.

#### ARSENIC.

*Formation of Arsenic Sulphides* in the corpses of persons poisoned with arsenious acid. L. A. Buchner found in the stomach of a corpse exhumed eight weeks after death, and which had died from the effect of arsenious acid, arsenic sulphide. Buchner accounts for its formation by the rise of ammonium-sulphhydrate which decomposes the arsenious acid, forming soluble sulph- and hyposulph-arsenites, which afterwards, by the oxidation of the solvent are reduced to the corresponding arsenic sulphides. N. Rep. Ph. xvii, 386.

*Detection of Arsenic.* Chs. E. Every has instituted a number of experiments on the well known silver nitrate test for arsenic acid. It is known that arseniate of silver is slightly soluble in an aqueous solution of ammonium nitrate, and readily soluble in both ammonia and dilute nitric acid; it is not easy to detect small quantities of arsenic by means of silver nitrate, as usually employed, unless the test be applied with great care. Every found that the addition either of sodium or ammonium acetate, or Rochelle salt, to a mixed solution of arsenic and nitric acids, is sufficient to insure the immediate precipitation of argentic arseniate when ammonio-argentic nitrate is introduced. Instead of the acetates or tartrates, recently precipitated argentic carbonate may be employed to neutralize free nitric acid. When present in relatively large quantity, arsenic acid readily precipitates silver from a solution of ammonium variable and ammonio-argentic nitrate, but the color is variable. Am. J. of Sci. & Arts, March, 1869.

Dr. R. Müller has constructed a simple *apparatus for the ready detection of arsenic and antimony* in minute quantities, for the use of physicians. It consists of a small test tube capable of containing 15 cubic centimetres; this is half filled with dilute hydrochloric acid, and closed by an India rubber stopper. A second stopper of the same material is furnished with a glass tube 3 millimetres wide, and about 4 centimetres long, bent at

right angles, one end drawn out to a point about 1 m. m. wide. To test the contents of the stomach, a few pieces of sheet tin are put into the acid, so that a strong evolution of hydrogen takes place, and the test tube is closed, after a few seconds, with the stopper bearing the glass tube. The escaping hydrogen is then lighted, and the flame directed against the cold surface of porcelain. If a dark spot shows itself, it may be arsenic or antimony, which can be distinguished by touching with a drop of Javelle's fluid, which dissolves arsenic but not antimony. Berlin. *Klinische Woch. Sch.* 1868.

*Sensitiveness of the usual methods for the detection of Arsenic.* M. Frank arrived, after a series of experiments, at the following results: Marsh's apparatus admits of detecting 0.0003 milligramme arsenious acid dissolved in 150,000,000 of liquid; the method of von Babo and Fresenius admits of detecting 0.002 milligramme arsenious acid; Reinsch's method, by means of copper, detects 0.001 milligramme arsenious acid in 5,000,000 of liquid; Rieckher's method, by means of ammoniacal argentic nitrate solution, detects 0.002 milligramme in 3,000,000 parts of liquid. *Ph. Z. Russl.* April, 1869, 244.

*Detection of arsenical Pigments.* C. Puscher advises the use of liquid ammonia for the detection of these pigments, all of which are soluble therein, exhibiting a blue-colored solution, if copper is at the same time present. On the evaporation of the solution there remains a dirty greenish-colored precipitate of arsenite of cupric oxide. C. Puscher advises to paint some white paper with this solution in ammonia, which painting, when dry, if arsenic were present, will exhibit a dirty greenish color, but if, after drying, a blue color has been imparted to the paper the pigment is free from arsenic, and only consists of a compound of copper, of which latter metal there are several in use as green and blue pigments, all soluble in ammonia, except such admixtures as do not essentially belong to the pigment itself. *Deut. Ind. Zeit.* Mai. 24, 1869.

#### BISMUTH.

C. A. Wood states that fusion with nitre removes copper from bismuth only partially. *London Ph. J.* Jan., 1869.

*Basic Bismuth Nitrate.* M. Roussin, (Journ. de Phar. & Ch. 4 ser. vii. 180) and C. Redwood (London Ph. J. 2 ser. x. 88) have contemporaneously called attention to the adulteration of the basic bismuth nitrate with calcium orthophosphates. Mr. Roussin's method of detecting this adulteration has already been published in the report to the Am. Ph. Ass. of last year, as well as in the Am. J. Ph. 40, 334.

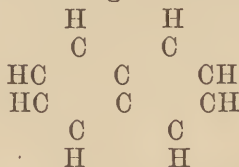
For this test, Messrs. Howard and Hornsby suggest the following modification as being necessary, since continued boiling causes a precipitate of bismuth itself when no phosphate is present: To one part of the sample to be tested, dissolved in weak nitric acid, add two parts of citric acid, dissolved in a little water, then add an excess of ammonia and boil. Any phosphate present will be thrown down on continuous boiling of the solution. London Ph. J. 1868, x. 347.

## CHEMISTRY OF THE ORGANIC BODIES.

### HYDROCARBONS.

Eighth series.  $C_n H_{2n-12}$ .

*Naphthalene.* C. Graebe publishes, in A. Ch. & Ph. 149, 1, his elaborate and critical studies on naphthalene, its chemical constitution, and its derivatives. He agrees with Erlenmeyer (Ann. Ch. & Ph. 137, 346,) that naphthalene is to be represented as constituted by two combining benzene units by this formula:



Fifth series.  $C_n H_{2n-6}$ . Aromatic Hydrocarbons.

*Xylene.* R. Fittig, W. Ahrens and L. Mattheides continued their elaborate studies on Xylene and the identical Methyltoluene and their derivatives and substitutions.. A. Ch. Ph. 147, 15.

*Mesitylene.* R. Fittig and W. H. Brückner continued their extensive studies on mesitylene and its derivatives, and R. Fittig

and J. Storer on the substitution products of mesitylene. A. Ch. Ph. 147, 1, 42.

*Pseudo-cumene.* R. Fittig found that the isolation of cumene is very difficult, and that most so-called cumene, even when its boiling point is constant, is a mixture of several isomeric hydrocarbons, containing but little pseudo-cumene. Fittig succeeded in preparing two bromide substitutions, the dinitro-bromide-pseudo-cumene,  $C_9H_9(NO_2)_2Br$  and dibromide-pseudo-cumol,  $C_9H_{10}Br_2$ . A. Ch. Ph. 147, 11.

#### ALCOHOLS AND ETHERS. MONATOMIC ALCOHOLS AND ETHERS.

##### ETHYL ALCOHOL.

The recent labors on, and contributions to, the manufacture of alcohol, which properly belong to the domain of technical chemistry, are compiled in Chem. Centr. Blatt. N. F. xiii. 1025—1039.

*Formation of a volatile alkaloid during the alcoholic fermentation.* Some years ago, Lermier called attention to a volatile alkaloid in beer. Recently, Oser has found the same basis as a product of the vinous fermentation, and has obtained and examined this new alkaloid; its formula is said to be  $C_{26}H_{40}N_4$ . Wittstein proposes the name Tigrin for it. J. f. Pract. Ch. 103, 192, & Viert. J. Schrift f. Ph. xvii. 440.

*Alcohol from Lichens.* M. Stenberg, with the idea to utilize the enormous quantities of Swedish lichens by transforming them into glucose and alcohol, succeeded best with *Cladonia rangifera*, H. Boiling it for twelve hours in water containing  $12\frac{1}{2}$  per cent. sulphuric acid hydrate, he obtained sixty-six per cent. glucose, which yielded a good alcohol with a slight flavor of bitter almonds. A. J. Ph. Jan. 1869, 17.

*Ethyl Iodate* is, according to K. Lisensko, obtained by acting upon argentic iodate by a mixture of equal volumes of ethyl iodide and dry ethyl oxide. If the temperature is not allowed to rise above  $10^\circ C$ . the liquid remains colorless and the new ether undecomposed. The solution distills between  $37^\circ$  and  $40^\circ$ . The distillate at first floats upon the water with which it had been mixed, but on passing a current of air through the liquid,

in order to drive off ethyl oxide, it sinks to the bottom of the vessel. All attempts at further purification failed. The liquid boils at  $75^{\circ}\text{C}$ . under decomposition. Zeitsch. f. Ch. N. F. iv. 455.

*Detection of Methyl Alcohol in Ethyl Alcohol.* In England and Holland alcohol used for scientific and technical purposes pays no duty, and in order to make it unfit for the manufacture of liquors, is admixed with one-eighth of its volume methyl alcohol. Therefore it is frequently required to examine alcohol for this admixture. For this reason, and in order to establish the deportment of pure and of mixed alcohol to reagents, as well as the reliability of the known methods, especially those of Tuck, of Reynolds, and of Miller and Young, for the detection of the admixture of methyl-alcohol, Dr. Gunning instituted a series of elaborate experiments. The author thinks Miller and Young's oxidation test the most reliable. N. Tijdschrift. v. Ph. in Nederland, 1868, 58.

Another apparently good test is recommended in the Tijdschrift v. wetenschapl. Ph. iii. 359, by Polack. It depends upon the circumstances under which iodoform is formed far more readily from methyl alcohol, than from ethyl alcohol. The sample is examined by carefully pouring it upon a stratum of sulphuric acid in a wide test tube, so that no heat is evolved. If the alcohol contains methyl alcohol, at the contact of both fluids a yellow cloud or coloration arises.

(This test has recently been proved to be very doubtful, since the reaction only takes place when a considerable proportion of methyl alcohol is present.)

*Detection of Alcohol in Liquids.* The Journ. de Pharm. 1868, gives the following method for the detection of alcohol:—The liquid to be tested is mixed with a portion of platinum-black in a small flask, heated to  $124^{\circ}\text{F}$ ., agitated and filtered. A few drops of caustic potassa are added to the filtrate, which is then evaporated to dryness. The residue is mixed with a little arsenious acid, and subjected to heat. If alcohol has been present, cacodyl is produced, recognizable by its odor.

*Estimation of Ethyl Nitrite in Sweet Spirit of Nitre.* John



T. Miller has suggested a method to estimate the quantity of ethyl nitrite in nitrous ether, depending upon the color reaction of the former with solutions of cupric salts. The copper solution is made by dissolving 200 grains pure copper in the necessary quantity of nitric acid; the solution is evaporated to dryness, the residue dissolved in four to five ounces water; any excess of acid is neutralized by soda lye; then sixty grains crystallized sodium acetate and so much water are added as to make the whole ten ounces.

In order to estimate the ethyl nitrite in samples of nitrous ether, two one-ounce flasks are used, each half-filled with this copper solution; to one of them the sweet spirit of nitre to be tested is added from a graduated burette until the liquid assumes a blue green tint. To the second flask a standard liquid, composed of 5 vol. true ethyl nitrite and 95 per cent. ethyl alcohol, is added in the same way, until the same color is obtained. From the quantities of both the standard liquid and the sample required to accomplish the reaction, the percentage of the ethyl nitrite contained in the sample is readily calculated.

In case the sample contains free acid, and consequently colors a weak potassium iodide solution, it has, previously to testing, to be shaken with some calcined magnesia. Zietsch. f. Anal. Chem., 1869, 279.

#### METHYL ALCOHOL.

*Artificial Methyl Alcohol.* E. Linnemann succeeded in converting methylamine, prepared from cyanhydric acid, according to Mendius' method, into methylic alcohol, by means of argentic nitrate. The identity of the alcohol thus obtained with the methyl alcohol from wood spirits, is proved by their equal boiling point. Ann. Ch. & Ph. 145, 42.

*Conversion of Methyl into Ethyl Alcohol.* A. Siesch converted acetonitrile, prepared by acting upon potassic methyl-sulphate with potassic cyanide, into ethylamine, and obtained from the nitrite of that base alcohol, which was found to be a mixture of ethylic and methylic alcohol, in the approximate proportion of four to one. The author explains the presence of the latter by the assumption that, during the decomposition of the nitrite of

ethylamine, the alcohol has been regenerated. Ann. Ch. Ph. 144, 46.

*Methyl Bichloride* has been first prepared in 1840 by Regnaud, from methyl alcohol; later it has been introduced by Dr. Richardson (London Pharm. Jour. 2 ser. ix. 234), as an anæsthetic. When pure it forms a colorless ethereal liquid smelling like chloroform; it is very volatile, and readily decomposed by light. Its anæsthetical properties are, according to Prof. Nussbaum, inferior to chloroform (N. R. Ph. xvii.107). Trommsdorff (N. Jahrb. d. Ph. xxx. 148), found that all methyl bichloride from the English and German market was only a mixture of three parts of chloroform and one part of various methyl chlorides.

#### PROPYL ALCOHOL.

*Normal Propyl Alcohol.* H. Trommsdorff succeeded in determining the presence of this isomeric modification of the three-carbon alcohol in the fusel oil (amyl alcohol), one of the products of ordinary fermentation. He obtained it, together with trimethyl carbinol (Buttlerow's tertiary butyl alcohol, Zeitsch. f. Ch. x. Ph. 1864, 385 & 702.) N. Rep. Ph. xvii. 688.

#### SECONDARY AROMATIC ALCOHOLS.

*Phenol.* L. Glutz believes to have proved by its transformation into oxysulpho-benzid by means of sulphuric acid, that phenol is an oxyhydrate. The author has prepared and studied a number of the derivatives of the oxysulpho-benzid, and has come to the conclusion that phenol contains, besides the hydrogen of the hydroxyl, a second hydrogen atom, readily substituted, and that Kolbe's and Lautemann's (Ann. Ch. & Ph. 115, 180), formula for phenol is correct:—



*Some differences between commercial Creasote and Carbolic Acid.* Phenol and its commercial forms, its therapeutical, anti-septic and disinfecting applications, have been and still are the subject of researches and suggestions, among which those of Hlasiwetz and Bensow are valuable.

It is well known that creasote in an alcoholic solution of ferric

chloride gives a green tint, carbolic acid a brown, and that in a watery solution creasote has no reaction, while carbolic acid yields a blue color. Hlasiwetz gives the following distinguishing test:—with three or four volumes of saturated baryta water, creasote gives only an incomplete cloudy solution; carbolic acid gives a clear solution, which after standing deposits nothing, or only a slight pulverulent sediment.

In liquor ammoniæ, at common temperatures, neither creasote nor carbolic acid dissolve. On warming, creasote remains undissolved, and after shaking subsides again with a beautiful yellow tint. Carbolic acid forms a clear solution with warm aqua ammoniæ, but separates, after cooling, with a violet brown discoloration. In dilute potash-ley both dissolve, but creasote with difficulty. Creasote requires much ley for complete solution, otherwise a portion of the creasote separates during agitation as the solution cools; addition of ley clears up the solution. Carbolic acid gives a clear and permanent solution, with a little ley.

To two drops of liquor ammoniæ in a test-tube add a solution of ferric chloride of such strength that the precipitate is redissolved on the addition of about four volumes of water. When a few drops of creasote are added, the solution becomes first green, then brown. Carbolic acid gives a blue or violet tint. Vierteljah. Schrift. f. Zahnheilkunde, 1868.

The Amer. J. of Dental Surg. gives still another test:—Creasote, when shaken with equal volumes of collodium, forms a stiff, somewhat opalescent jelly, phenylic acid a viscous clear solution.

*Phenates.* It is well known that phenol dissolves in alkalies, forming salts called phenates, which, however, are difficult to obtain in definite form. J. Romei describes, in the Bulletin de la Soc. chim., Feb. 1869, the mode of preparation and the properties of the phenates of potassium, copper, mercury and quinia. London Ph. J. vol. x, 645.

*Sulpho-phenates.* Under the name sulpho-carbolates a class of salts have been recently introduced into medical practice. They are prepared by acting upon commercial carbolic acid with

sulphuric acid at a temperature of 280°F. or a little higher. They appear to possess the same properties as the crude carboic acid, and if this proves to be the case, they will be preferable in many cases, since they do not possess the strong odor.

*Dichlorophenol* is obtained by passing a current of dry chlorine through phenol, and purified by repeated rectification and recrystallization from benzol. It forms fine, silky needles which fuse at 42° to 43° C. and boil at 209°C. It forms crystalline salts of no great stability. Its ethyl ether is obtained as a colorless oil, boiling at 226°C. Goett. Nachrichten 1868, 171.

*Dinitrophenol*. Since Lautemann has shown that trinitrophenol, under the action of iodhydric acid in statu nascenti, is transmuted into triamidobenzol (picramin), it was interesting to ascertain how dinitrophenol would be acted upon under the same circumstances. Fr. Gauhe has proved, by a series of experiments, that the corresponding compound of diamido-benzol results. Ann. Ch. und Ph. 147, 66.

*Nitroxyphenyl-sulphuric acid* and *dichloroxyphenyl-sulphuric acid* have been prepared by H. Kolbe and Fr. Gauhe by direct introduction of nitrogen-tetroxid and chlorine into oxyphenyl-sulphuric acid. The authors established the constitution of both acids and of some of their salts. Ann. Ch. und Ph. 147, 71.

*Therapeutics of Phenol*. The applications of the so-called carboic acid in medicine and surgery are increasing; there are several notes in medical, pharmaceutical and chemical journals which report in favor of phenol in various diseases. Interesting among them are Dr. Jos. Hirsch's experiments on the action of phenol on animal albumen, (Ch. N. A. R., April 1869, 192,) and the recommendation of phenol as a cure for snake bites, by Dr. W. Hood, of Melbourne, Australia.

*Antidote to phenol*. Cr. Calvert states, in the Med. Times and Gaz., that the best antidote after the stomach-pump is large doses of olive or almond oil, with a little castor oil. Oil is a solvent, and consequently a diluent of phenol, and may be used to check the corrosive effect of the poison.

*Cholesterin* was previously believed to be a product solely of the animal organism. Beneke, however, established in 1862 its

formation and presence in the cotyledons of peas and beans, (Ann. Ch. Ph. 122, 249,) and soon afterwards Ritthausen found it in wheat, and more recently in rye. K. Lintner found it also in barley. Ritthausen ascertained, at the same time, that the fat of rye is palmitin, and not stearin as heretofore believed. J. f. pract. Ch., 1867, 324. N. Jahrb. f. Ph. xvii, 281.

#### TRIATOMIC ALCOHOLS AND ETHERS.

*Methenyl Chloride. Chloroform.* The extensive literature of chloroform has been enriched during the last year by continued researches and studies. Foremost among them are the labors of Schacht (Arch. d. Ph. 182, 213 and 183, 192 and 186, 50,) of Hager (Centralhalle, ix, 75, 81, 155 and 239,) of Biltz (Arch. d. Ph. 184, 203,) of J. M. Maisch (A. J. Ph. 1868, 289,) of Rump (N. Rep. Ph. 1868, 545, A. J. Ph. Jan. 1869, 19,) of H. Trommsdorff (N. Jahrb. Ph. 30, 148,) of Personne (Bull. de l'acad. de Med. 30, 747,) of Wollert (Upsala Läk. fören. Foerhandl. III, 285,) of Almen (ibid. iii, 291,) and of Bresgen (Arch. d. Ph. 186, 221.)

A brief survey of these labors, although perhaps desirable, would greatly extend the limits of this report. Consequently reference is made to the principal contributions on the subject, and the following summary of their main points:—

*Preparation of Chloroform.* It is best prepared and purified according to the well known methods of Hirsch and Maisch.

*Constitution.* Chloroform is the triatomic methenyl ether— $\text{CHCl}_3$ —its density when pure is at  $15^\circ\text{C}$ . 1.50, its boiling point  $+62^\circ\text{C}$ . Any higher or lower specific gravity or boiling point are evidence of foreign substances, mostly alcohol. Pure methenylchloride is a stable compound, not decomposing when excluded from the action of oxygen and light, but readily decomposed by light in the presence of oxygen. This oxidation is as yet not satisfactorily accounted for; it is only established that the products of this decomposition are: free chlorine, hydrochloric acid and probably carbon-oxychloride ( $\text{COCl}_2$ ), three objectionable substances for inhalation. It remains to be decided if ethyl-chloride, carbon-chlorides and chloral are also products of this decomposition of chloroform.



Absolutely pure chloroform therefore can be kept in tubes, void of atmosphere and sealed, but it cannot be kept under common circumstances.

To all appearance, as the studies of Maisch, Rump, Biltz and others evidently show, an addition of one or two per cent. of ethyl-alcohol (and perhaps other alcohols and ethers) prevent this oxidation of chloroform by the atmospheric oxygen under the action of light and warmth for a considerable time.

The long and fierce controversy on the pretended stability or the proved decomposition of chloroform has finally been successfully elucidated and referred to the purity of the chloroform upon which the respective inquirers operated.

Wiggers proposes, for chloroform of the spec. gravity of 1.48 to 1.496, which contains one to two p. c. of alcohol, the name chloroformium officinale, and suggests its keeping in our store-rooms under a layer of distilled water, taking it out, when required, by means of a syphon or a pipette.

Maisch suggests for the officinal chloroform a density of 1.4750 to 1.480, corresponding to an admixture of about two per cent. of alcohol.

Each chloroform when bought ought to be examined on its specific gravity, its boiling point and its neutrality; its odor has to be pure and not in the least suffocating. Of all the methods to establish partial decomposition, the well known test of Biltz is perhaps the most reliable one. It depends upon the detection of chlorine by perfectly neutral potassium iodide. The test is best executed by adding in a test tube, to a little of a solution of 1 part potassium iodide in 20 parts water, drop by drop, about two equal volumes of the chloroform. When shaken a chloroform containing but traces of free chlorine turns rose colored, and the watery solution at the same time yellow; after this, each drop chloroform falling through the watery solution accepts a purple coloration.

Biltz has satisfied himself that neither ozone nor carbon-oxy-chloride cause this reaction.

A chloroform which has partly undergone decomposition can, according to Schacht (*Arch. d. Ph.* 186, 50), be fully restored

to its original purity by agitating with potassium hydrate and rectifying.

*Testing Chloroform for Alcohol and Ether.* Since all or, as may be hoped for, nearly all commercial chloroform contains a slight percentage of alcohol, the well known test for this admixture by means of potassium bichromate is obviously a *contradictio in abstracto*, but in case it is required to establish the complete absence of alcohol in methenyl chloride, this test is the most delicate. The specific gravity is more or less a good standard for commercial chloroform. For a more close investigation M. Braun suggests the following test: The sample is first treated with fused calcium chloride, in order to eliminate any water; next some iodine is added. If the chloroform is free from either alcohol or ether the color produced by the solution of the iodine is bright red; but when either alcohol or ether are present the color of the solution is brown. In order to distinguish between alcohol and ether a small crystal of fuchsin is dropped upon the surface of the sample; when the slightest trace of alcohol is present a deep red solution will ensue, whilst perfectly pure chloroform yields, with fuchsin, a solution which has only a slightly pinkish tinge. Zeitsch. f. Anal. Chem. v, 253.

*Chloroform in the Urine.* The London Ph. J. contains the following, and may take the responsibility for this note from the Journal de Pharm. d'Anvers: The urine of patients who have inhaled chloroform gives, with Trommer's test, a copious indication of the presence of sugar. This reaction, however, is not due to sugar, but to chloroform. Traces of chloroform in the urine cause a reduction of the cupric oxide in the same manner as glucose. The presence of chloroform in urine may be detected by causing a current of air to bubble through the urine, then through a red-hot porcelain tube, and finally, through a Liebig's bulb containing a solution of argentic nitrate. The vapor of the chloroform diffused in the stream of air is decomposed in the heated tube, and the resulting chlorine precipitates the silver solution. London Ph. J., Febr., 1869, 486.

*Propenyl Alcohol. Glycerin* ( $C_3H_8O_3$ ). A. Vogel and Fuchs, supposing that pure glycerin does not unite with water, but only

mixes with it, and that, therefore, when they are being mixed, neither expansion nor condensation occurs, have calculated for the specific gravity of glycerin a formula, to ascertain from the density of each sample of glycerin the quantity of water contained therein. Ph. Centr. Halle, ix, 177.

Schweikert has corrected this table by a more minute determination of the specific gravity of glycerin, this being 1.26672. His formula for the calculation of water in glycerin by means of its density is the following :

$$x = \frac{100b(a-c)}{c(a-b)} \text{ or } x = \frac{100(a-c)}{ac-c.}$$

Accordingly Schweikert calculated the following table :

*Percentage of water in Glycerin at the respective spec. gravity.*

Spec. gr.	Water.	Spec. gr.	Water.	Spec. gr.	Water.	Spec. gr.	Water.
1.267	0	1.224	13	1.185	26	1.147	39
1.264	1	1.221	14	1.182	27	1.145	40
1.260	2	1.218	15	1.179	28	1.142	41
1.257	3	1.215	16	1.176	29	1.139	42
1.254	4	1.212	17	1.173	30	1.136	43
1.250	5	1.209	18	1.170	31	1.134	44
1.247	6	1.206	19	1.167	32	1.131	45
1.244	7	1.203	20	1.164	33	1.128	46
1.240	8	1.200	21	1.161	34	1.126	47
1.237	9	1.197	22	1.159	35	1.123	48
1.234	10	1.194	23	1.156	36	1.120	49
1.231	11	1.191	24	1.153	37	1.118	50
1.228	12	1.188	25	1.150	38		

Ph. Centr. H. ix, 407.

*Glycerine as a solvent.* J. W. Klever publishes the following statements: 100 parts of glycerin (spec. gr. not stated) dissolve: arsenious acid, 20 p.; benzoic acid, 20 p.; oxalic acid, 15 p.; bicyanide of mercury, 27 p.; corrosive sublimate, 7.50 p.; alum, 40 p.; arseniate of potassa, 50 p.; strychnia, 0.25 p.; morphia, 0.45 p.; acetate of morphia, 20 p. The following substances are insoluble in glycerine: ether, benzol, camphor,

bisulphide of carbon, chloroform, bromide and iodide of mercury, calomel, fatty acids, fatty and volatile oils. Glycerine is decomposed by chromic acid, potassium bichromate and potassium permanganate. Ph. Zeitsch. f. Russl. March, 1869. Ch. N. A. R. Aug., 1869, 96.

Werner avers to have succeeded with the following experiment for the crystallization of glycerine: he was not able to "crystallize glycerine either by agitation or cold," but having recognized the presence of chlorine in some solidified glycerine, he made the experiment of passing a few bubbles of chlorine through commercial glycerine, and obtained small octahedral crystals, possessing great hardness, but deprived of the sweet taste of glycerine, even when melted." Zeitsch. f. Ch. June 17, 1868. Ch. N. A. R. March, 1869, 142. A. J. Ph. January, 1869, 17.

*Impurities and admixtures, and their detection.* It is well known that commercial glycerine sometimes has an irritating effect; it was supposed that oxalic or formic acids were the cause. A. Duflos, however, states that this is not the case; he distilled perfectly pure glycerine in vacuo, whereby it got the irritating qualities. For this reason, and because such glycerine with argentic sulphate and ammonia liquor on heating reduces the silver, and because it loses its irritating effect simply by solving it in water and subsequent evaporation, Duflos concludes that acrolein is the cause of this objectionable property of some kinds of crude commercial glycerine. Acrolein as an aldehyde is known to be produced by dehydration of glycerine. Duflos, Chem. Apoth. b. p. 864.

Schepky found in commercial glycerine among other impurities also traces of nitric acid, recognizable by the test with ferrous sulphate and strong sulphuric acid. (Arch. Ph. 185, 16.) Perutz states, in Polyt. Centralbl., 1868, 638, that crude glycerine contains as much as one-fourth to half per cent. butyric acid, readily recognizable by agitating a sample of the glycerine in a test tube with some alcohol and strong sulphuric acid; if butyric acid is present, the pine-apple-like flavor of ethyl butyrate is noticed.

Ammonium molybdate has been added by A. Vogel to the

several reagents for testing glycerine for sugar, glucose, dextrin and gum. When glycerine, previously diluted with from twenty to twenty-five times its bulk of water, is mixed with a few drops of a solution of ammonium molybdate and nitric acid, the mixture, when heated, becomes colored blue when the glycerine contains any sugar; when dextrin is present the reaction is not so marked, and the color rather more greenish. The adulteration by dextrin or by glucose, however, is infallibly detected by Trommer's copper test, as applied to the detection of grape sugar; as for gum, the ammonium molybdate is a good test. N. Rep. Ph. xviii, 24.

*Nitro-glycerine.* F. Tilberg made a series of experiments with nitro-glycerine; he found among the products of decomposition, when acted upon by potassium hydrate, potassium nitrate, glycerine, ammonia, cyanogen, oxalic, nitrous and humic acids.

Nitro-glycerine dissolves in concentrated sulphuric acid, forming with it a new compound acid, which yields crystalline salts. A combustion gave three vols. of carbonic anhydride to one vol. of nitrogen. If nitro-glycerine is regarded as substituted glycerine, and the relation between it and the new acid is the same as that between glycerine-sulphuric acid and glycerine, the new compound will be dinitro-glycerine-sulphuric acid. Oefvers. af Stockholm Ak. Foerh., 1868; 25, No. 2, 75.

For the detection of nitro-glycerine in cases of poisoning, A. Werber suggests the following process: the organic material to be tested is extracted with ether or chloroform, the extraction mixed on a watch glass, with two or three drops of pure aniline, and evaporated upon the water-bath. A few drops of concentrated sulphuric acid are then added, when, if nitro-glycerine is present, a purple coloration appears, which changes to a dark green on dilution with water. As little as .001 grain of nitro-glycerine may thus be identified. Zeitsch. f. Anal. Chem. vii, 158.

*Frangulin* is obtained, according to Casselmann, by extraction of the bark of *Rhamnus frangula*, L., with ammoniated water. The decoction is precipitated by hydrochloric acid, and the precipitate is boiled with alcohol. The alcoholic solution is precipitated with basic plumbic acetate, the precipitate decom-



posed by sulphhydric acid, and the frangulin is extracted by boiling alcohol. The alcohol is distilled off, and from the remaining liquid the frangulin is precipitated by water. By repetition of this operation the frangulin is obtained pure. It forms a yellow crystallizable substance, insoluble in water, slightly soluble in alcohol and ether, but more freely when warm; it is further soluble in some oils, in benzol and in oil of turpentine. Alkalies dissolve it with red color. Acids split it into glucose and frangulic acid, forming yellow crystals, readily soluble in alcohol and ether. Faust prepared and studied, besides this acid, the dibrom-frangulic acid and difrangulic acid. *Zeitsch. f. Chem.* xii Jahrg. vol. v, and *Ph. Zeitsch. f. Russl.*, April, 1869.

#### HEXATOMIC ALCOHOLS AND ETHERS.

*Cane-sugar or Saccharose.* All new researches and contributions to the manufacture and refinement of sugar are compiled and criticised in *Chem. Centralblatt*. N. F. xiii, 993—1007.

It is a well-known fact, established by former researches of Soubeiran, Berthelot, Maumené and Béchamp, that the transformation of saccharose into glucose occurs not only by the influence of acids, but also, though slower, in a simple watery solution; it is accelerated by certain salts, whilst others retard or check the transformation. Clasen (*Journ. f. pract. Chem.* 53, 449,) has instituted a series of experiments on this subject, and states that a watery solution of saccharose passes but very slowly into glucose without the aid of fungi. Some salts as, for example, calcium sulphate, ammonium chloride, potassium nitrate, etc., prevent this change at common temperature; but if such a sugar solution containing calcium sulphate, potassium nitrate and ammonium chloride, after some days is heated to  $+87^{\circ}\text{C}$ ., the transformation into glucose goes rapidly on, especially when gypsum and sal ammoniac are present. This experiment can only be conducted for some days, since with the formation of fungi a new source for the continued transformation rises. The quantity of glucose produced under these circumstances is comparatively but slight, and can only be proved by Fehling's alkaline copper-test.

*Beet Sugar and Cane Sugar.* It is well known that refined beet sugar is not to be readily distinguished from cane sugar, especially when in large crystals. But their solutions show some slight differences. The solution of beet sugar, for example, colored by some indigo-carmin solution, cannot sufficiently be concentrated to solidify after cooling, without changing the blue color into green or completely discoloring it, whilst this is not the case with cane sugar. This may be caused either by traces of nitrates or of glucose, which is still to be decided. A. Vogel suggests the spec. gravity as a means of distinguishing both kinds of sugar, since the density of cane sugar to glucose is as 20:19. This spec. gravity is best to be ascertained by volumetric measurement of absolute alcohol displaced by weighed bulks of sugar. N. Rep. Ph. 18, 154.

*Glucose.* The transformation of starch into glucose in the manufacture of so-called starch sugar (glucose) by the action of sulphuric acid, goes on slower and slower, the nearer the process comes to its termination. Manufacturers therefore frequently do not furnish it completely transformed, and for this reason commercial grape-sugar contains more or less dextrin. A. Maubré ascertained that the complete transformation of starch and of dextrin into glucose is considerably promoted and accelerated, when the operation is conducted under a higher pressure than the common atmospheric one, so that the boiling point is considerably raised. Maubré's process and *modus operandi* are described in Chem. Centralbl. 1868, p. 148.

*Starch.* Jessen has continued his researches on starch, and has published the results of his recent investigations. The author denies that starch, as is believed by some chemists and physiologists, can be considered to be a vegetable proximate principle, since it is composed, besides the various admixtures as, for example, wax, vegetable fat, chlorophyl, dextrin, etc., of three distinct organic substances:—cellulose, amylogen (amidin) and amylin. The percentage of the cellulose is but a slight one, and the latter two are its principle constituents, and those to which its characteristic properties are due. J. f. Pract. Ch. 105, 65.

Notwithstanding the numerous elaborate researches and studies

on starch, our knowledge about its chemical constitution and its origin is still wanting; as yet no conclusive elementary analysis of either of these constituents have been arrived at, since their complete separation and preparation are a matter of considerable difficulty.

Method for *determining the percentage of water contained in starch*. C. Scheibler publishes, in *Berichte d. Deutsch. Chem. Ges. in Berlin*, 1869, No. 8, in a lengthy paper, the result of elaborate experiments for the determination of the quantity of water contained in starch, which paper is of special value to starch and glucose manufacturers.

Since starch is insoluble in alcohol and only contains very slight traces of fatty matter, Scheibler supposed that the object to be obtained might readily be attained by determining the change which the specific gravity alcohol suffers after having been for some time in contact with wet starch. After a number of experiments the author devised the following mode of the test:—100 c. c. of the alcohol, weighing 83.4 grms., was placed in a glass stoppered bottle, and thereto were added 41.7 grms. of divers samples of starch, in separate samples, of which the quantity of water therein contained had been previously ascertained with great accuracy. They were left with the alcohol in contact for one hour, frequently shaking the bottle. Then the alcohol was separated from the starch by filtration, and its specific gravity determined.

While experimenting, C. Scheibler observed that, when the starch contains less than 11.4 per cent. of water, instead of yielding up water to alcohol of the above-named strength, it withdrew water from that alcohol.

M. Guichard proved, by a number of experiments by means of the dialyser, that the so-called *iodide of starch* is simply starch tinted by iodine, and that heat alone is sufficient to separate both. *Ch. N. A. R.* Sept. 1868.

*Gum*.—*Qualitative and quantitative determination of gum arabic in solutions containing sugar and dextrin*. Z. Rossin devised a method for this purpose, based upon the precipitation of gum by ferric salts. Since, however, this precipitate, on

account of its tenacity, could not be obtained free of foreign substances without loss, the author has suggested the following modification of his method : The solution to be examined is evaporated nearly to dryness and then précipitated by the addition of its tenfold bulk of alcohol of 90°. The precipitate is washed with alcohol and dried. One gramme of it is then dissolved in 10 cub. centim. distilled water ; this solution is transferred into a bottle large enough to hold 60 cub. cent., then 30 c.c. alcohol of 56° and four drops of a solution of ferrie chloride (containing 26 per cent. anhydrous ferrie chloride) are added, and finally a few decigrammes of precipitated chalk. After frequently agitating, the liquid is transferred upon a filter. When the filtrate, if mixed with eight to ten times its volume of strongest alcohol remains clear, the solution contained, besides the gum, no dextrin.

It is obvious that this test is readily applicable for the quantitative determination of gum as well as of dextrin. Ph. Centr. Halle, x, 141.

*Acorin.* A Faust succeeded in preparing from calamus rhizomes a new glucoside. Five pounds of the dry rhizomes yielded one drachm acorin, a soft resinous mass of the strong taste and flavor of the rhizome. It dissolves readily in alcohol and ether, contains nitrogen and, like all glucosides, splits under the action of acids and heat into glucose and a resinous body not yet examined. Viert. Schrft. f. Ph., xviii, 136.

*Digitalin.* Nativelle's labors on digitalin and its preparation, published in 1867, (Monit. Scient. 1867 & N. Jahrb. f. Ph., xxvii, 161) have since been confirmed by more recent communications on the subject, and his mode of preparing digitalin has been adopted in the new French Codex. Only slight modifications have been suggested by J. Lefort, (Journ. de Ph. & de Chem., vi, 424) but which were already proposed in 1844 by Homolle and Quevenne.

Recently M. Nativelle has recognized a crystallizable substance, which accompanies the digitalin, and which he succeeded to separate. The author reports his method at length in Journ. de Ph. & de Chim., 1869.

Since the existence of two modifications of digitalin—amor-

phous and crystallizable—are known, it remains to establish by further researches the constitution and the relations of digitalin.

## ORGANIC ACIDS.

### MONATOMIC ACIDS.

*Acetic Acid.* A plan of testing the strength of acetic acid, likely to be of great use, has been published in the "Photographic Journal." It was observed independently by M. Berthelot and Mr. E. C. Nicholson, that an acid which, although of a high degree of purity, is not glacial, becomes inflammable when the temperature is raised to the boiling point. When boiled in a test tube the vapor of an acid of 95 per cent. will be found to take fire on applying a lighted match, and burns steadily as long as the ebullition is maintained; if, however, 10 per cent of water be mixed with the sample, there will be great difficulty in causing inflammation, and the vapor, when ignited, will only burn with a lambent flame of pale blue cones, whilst below this strength the acid vapor is altogether inflammable.

In some respects the deportment of carbolic acid resembles acetic acid in the characters above described; it likewise becomes glacial upon separation of the last traces of water.

*Oxidation of Acetic Acid into Oxalic Acid.* F. Lossen states that when one part of sodium acetate, one part of sodium hydrate and two parts of potassium permanganate are dissolved in a little water, the solution concentrated by boiling, and next brought to dryness at a temperature at which oxalic acid is not decomposed, and this heating continued until a small portion ceases to yield, with water, a green-colored solution, oxalic acid can be readily proved to exist in the remaining saline mass. Ann. Ch. & Ph., 148, 174.

*Dichloroacetic Acid.* A. Dumas, as well known, several years ago made the interesting observation that, by the action of chlorine on acetic acid, one equivalent hydrogen after the other can be substituted by the corresponding number of chlorine equivalents and that the products remain strong acids.

These acids, particularly their dichlorated substitute, have recently become, besides their scientific value, of practical interest,



since Dr. Urner (Schweiz. Wochensch. f. Ph., 1869, 321 and 327) has called attention to the powerful caustic virtues of the dichloroacetic acid, which he thinks superior to the usual cauteries, since it produces less pain, acts more locally and allows a quicker healing. Processes for its preparation have been given by Dumas, Hoffmann and Maumené, and it has been obtained on a large scale and brought into commerce by Cl. Marquard, in Bonn. Since, however, these methods are expensive and yield only comparatively small quantities, and since the acid, to all appearance, will become one of the best cauteries, the Pharmaceutical Assoc. of Switzerland has, for these reasons, offered two premiums for the two best essays on dichloroacetic acid and the best and cheapest method of its preparation. N. Rep. Ph., xvii, 513.

#### BENZOIC ACID.

*Preparation of benzoic acid by Rump's apparatus, vid. p. 138.*

*Conversion of Benzoic into Anthranilic Acid.* The action of bromine upon benzoic acid gives rise to the formation of monobrom-benzoic acid. This acid, according to H. Hübner and A. Petermann, may be successively converted into bromamido-benzoic acid and amido-benzoic acid, which is identical with anthranilic acid, by shaking the bromamido-acid with sodium amalgam. The acid crystallizes in long needles; its identity with anthranilic acid is proved by the fact that, when treated with nitrous acid, it produces a purple coloration with ferric chloride, a reaction which distinguishes salicylic acid from oxybenzoic and para-oxybenzoic acids. Zeitsch. f. Ch. N. F., iv, 205.

#### CINNAMIC ACID.

*The Derivatives of Cinnamic Acid* have been the subject of C. Glaser's continued investigations (A. Ch. & Ph., 143, 325). The author has transmuted cinnamic acid (phenyl-acrylic acid) by addition of hypochlorous and hypobromous acids into a series of homologous acids. Ann. Ch. & Ph., 147, 78.

#### VALERIANIC ACID.

*The formation of Acetic and Formic Acids in the preparation of Valerianic Acid* by the action of potassium bichromate and sul-

pluric acid on fusel oil has been observed previously, but the quantity of either has, as yet, not been ascertained. J. Sticht, operating on large quantities of fusel oil, obtained from 400 pounds of oil a little more than 200 pounds of valerianic acid, and about  $12\frac{1}{2}$  pounds acetic acid. Viertelj. Sch. f. Ph., xvii, 436.

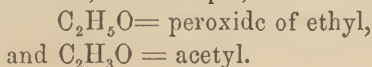
Since the therapeutical value of valerianic acid was based upon the acid derived from the root of *Valeriana offic.*, L., it was doubted that the artificial acid prepared from fusel oil, and containing more or less acetic and formic acids, was of equal medicinal value with the natural acid.

In order to elucidate this question, Stalman instituted a series of comparative researches with both acids; the author found that both, when pure, in their elementary constitution as well as in most of their properties are alike; the only slight differences he found are their different boiling points, which is for the natural acid at  $175^{\circ}$  C., and for the artificial at  $174.6^{\circ}$  C., and the difference in their barium salt, already observed by Dumas in 1840; the barium valerianate of the natural acid crystallizes with two water atoms in large crystals, whilst the crystallization of the same salt with the artificial acid has not yet been effected.

Stalman, therefore, thinks both acids to be isomeric modifications, and the question of the therapeutical equivalence of the artificial acid a still open one. Ann. Ch. & Ph., 147, 129.

Fred. Mussgiller, in Proc. Am. Ph. Ass., 1868, 396, reports on his researches on the mode of preparing valerianic acid and on its specific gravity; the author adds a table of the densities of the successive quantities obtained at the distillation of the acid, and their respective boiling points, and suggests 0.935 as perhaps the proper and sufficient strength of the officinal acid.

*Action of Sodium on the Ethers of the Fatty Acids.* Prof. Wanklyn reported to the London Chem. Soc., as the final result of his researches, continued through five years, that the ethers are resolved into two parts by the action of sodium, viz.: into peroxide of the alcohol-forming radical and into acid-forming radical. Acetic ether, for example, is broken up into:



The peroxide of the alcohol-forming radical is always found in the state of combination with sodium. The acid-forming radical is sometimes found isolated and sometimes in combination with sodium. Ch. N. A. R., Febr., 1869, 88.

#### DIATOMIC AND MONOBASIC ACIDS.

*Lactic Acid.* Lime water has been recommended as an effectual remedy to remove the pseudo-membrane in croup. More recently lactic acid is said to answer still better; the diseased parts are repeatedly touched with a watery solution containing 10 per cent. lactic acid. Ph. Centr. Halle, xi. No. 50.

#### DIATOMIC AND BIBASIC ACIDS.

*Oxalic Acid.* Fr. Stolba recommends and describes, in Zeitsch. f. anal. Ch. viii, 63, the mode of sublimation as the best method to obtain pure oxalic acid for analytical purposes.

Drechsel succeeded in the production of oxalic acid by direct combination of potassium with carbonic dioxide:—



The potassium salt is obtained by passing carbon dioxide over a heated potassium amalgam; the sodium salt by passing the gas over a heated mixture of sodium and sand. Ann. Ch. & Ph. 146, 140.

*Succinic Acid* is, as well known, produced by the oxidation of many of the fatty acids and their glycerides. Recently Berthelot (Ann. Ch. & Ph. Suppl. vi, 184), has produced it by the action of potassium permanganate upon butyric acid; Weissner and Shepard (Journ. de Ch. Méd. 5 Ser. iv, 177) from benzoic acid by means of plumbic dioxide and sulphuric acid, and A. Eller and H. Wichelhaus (Ber. d. Deutsch. chem. Ges. 1868, 98) from chlor-propionic acid by the action of potassic cyanide.

#### TETRATOMIC AND MONOBASIC ACIDS.

*Tannic Acid.* Wagner divides the tannic acids into two groups:—

1. Pathological tannic acid has its origin in pathological conditions of vegetable life, mostly of quercus and rhus species. When their young branches are pierced by insects of the genus *Cynips*, they are affected at the points of puncture with a morbid

action, resulting in excrescences rich in tannic acid. The occurrence of this modification of tannic acid in the oak bark, rhus and in other plants is denied by the author. Its principal characteristic properties are:—1, by fermentation as well as by the action of acids it splits into gallic acid and glucose, which, however, is immediately decomposed further into alcohol, into carbonic, lactic, propionic, and butyric acids and numerous substances. 2, It is the only tannic acid which yields pyro-gallic acid. 3, It precipitates solutions of glue, but does not transform corium into leather.

2. Physiological tannic acid includes all those tannic acids occurring in the bark of the oak genus, in pines, willows, etc. This acid does not split by the action of acids; when heated it does not form pyrogallic acid but pyrocatechic acid; it tans corium completely.

This division appears to be admissible in general, but as regards the distribution of the tannic acid in the vegetable kingdom, its ideas are contradicted by observations and researches, for example by H. Hlasiwetz (Ann. Ch. & Ph. 143, 292, and *ibid.* 142, 233), and others. Jour. f. pakt. Ch. N. F. iv, 595.

*Tannic Acid from Chinese Galls.* According to E. Schmidt, Chinese galls yield in the average 65 per cent. pure white tannic acid by the following process:—1000 parts of the powdered galls are macerated for two or three days with a mixture of 1000 parts ether and 250 parts alcohol, and then expressed. The residue is treated once more in the same manner with 600 to 700 parts of the same ethereal mixture. The combined liquids are then distilled from a retort, in which they were mixed with 150 to 200 parts of water, and all ether and alcohol drawn over. The residual watery solution is evaporated to dryness, after which the residue is again dissolved in one-half its weight of water. Too great a dilution of the fluid is to be avoided, since it will favor a resolution of chlorophyll and resin. It is milky, and is heated, with replacement of the water which evaporates, for one or two hours in the steam bath at a temperature of about 140° F; then set aside for complete cooling, when it will yield a pure tannin. Arch. d. Ph. 184, 213.

*Tannic Acid in Vegetables.* H. K. Bowman has ascertained, by Müller's volumetric method, the amount of tannic acid contained in a number of vegetable astringents, and gives the result in a table in Am. J. Ph. May, 1869, 193.

(The author has in several cases omitted to state the part or parts of the respective drugs employed.)

*Transformation of Tannic into Gallic Acid.* It has long been known that tannic acid under the action of various substances and the air assimilates water equivalents and splits into gallic acid. Van Tighem, in an essay in the Zeitsch. f. Chem. N. F. iv, 222, attributes the cause of this transformation to the action of fungi, especially *Penicillium glaucum* and *Aspergillus*.

*Phlobaphen.* Grabowsky, in a paper in the Jour. f. prakt. Ch. 1868, No. 23 & 24, describes an amorphous kind of tannic acid precipitated by plumbic acetate, as the principal constituent of the oak bark. When this phlobaphen, as he terms it, is boiled with dilute sulphuric acid, it splits into glucose and oak-red (eichenroth); when purified its elementary composition is  $C_{26} H_{24} O_{14}$ .

*Volumetric determination of Tannic Acid.* J. Watts, in the London Ph. Journ. October, 1868, 223, corroborates Fleck's volumetric method of estimating tannic acid by means of cupric acetate. This mode is not fully correct, since the whole of the coloring matter is precipitated at the same time with the tannic acid. Watts found that 1 gramme of commercial tannic acid, dried at 100° C., combines with .3911 grammes of metallic copper = .489 grammes of oxide. Watts made a number of experiments, in order to ascertain whether the cupric tannate precipitated from solutions of the various tanning materials possess in all cases the same composition as that obtained from nut galls. Although they show a slight variation, all tannic acids yielding a blue precipitate with ferric oxide salts, insoluble in either ammonia or its carbonates, may be brought into calculation as tannic acid. But not all tannic acids giving a blue precipitate with ferric oxide, can be determined by Fleck's method, because the precipitated tannate is more or less soluble in ammonium carbonate solution. Watts calls this modification mimotannic acid or mimosatannin.



Tormentil, rhatany, larch bark, willow bark, hemlock bark, catechu, kino, etc., were found to contain this mimosatannin. Referring to the recent labors of Stenhouse, Kawalier and Knop on the constitution of tannic acid, whether it be a glucoside or not, Watts thinks the arguments increasing for separating the varieties of tannic acid into two genera, and hopes for a speedy artificial production of tannic acid by synthetical means, which would yield it free from organic admixtures, and afford the opportunity to estimate its combining number for analytical purposes, and also set at rest all doubts about its constitution. London Ph. Journ. Oct. 6, 1868, 223.

*Ellagic Acid.* In commercial tannic acid is always gallic acid, and consequently ellagic acid which proceeds from it. A cold extract of oak bark gives by degrees a yellow deposit of ellagic acid, and it is this which constitutes that gelatinous covering which is formed over tanned hides. J. Löwe, in Journ. f. pract. Chem. 103, 469.

According to J. Löwe, ellagic acid is formed when an aqueous solution of two equivalents of gallic acid and one of arsenic acid is kept near the boiling point for several hours. J. f. prak. Ch. 103, 469.

#### TETRATOMIC AND BIBASIC ACIDS.

##### TARTARIC ACID.

M. Juette gives, in the Comptes Rendus 66, 417, a method of *estimating tartaric and malic acids* by means of iron, aluminium, manganese, etc., and *vice versa*. Ch. N. A.R. Oct., 1868, 179.

*Quantitative estimation of Tartaric Acid.* Martenson, after ascertaining the almost complete insolubility of calcium tartrate in alcohol of eighty-five per cent. strength, suggests the following method for estimating the amount of tartaric acid in potassic bitartrate and its other salts: They are, when perfectly dry, dissolved in a small quantity of water, then pure calcium chloride solution is added, with the precaution to avoid excess thereof; afterwards a few drops of lime-water are added, and the porcelain capsule is left standing for some hours. The crystalline precipitate is then collected, washed with alcohol, dried and weighed as— $2\text{CaO}, \text{C}_8 \text{H}_4 \text{O}_{10} + 8\text{HO}$ .

When either hydrochloric or nitric acid is present along with tartaric acid, the fluid is first nearly neutralized with calcium carbonate and warmed to expel the carbonic acid gas, while the last traces of the acid are removed with lime-water. The presence of either ammonium chloride or calcium chloride in excess interferes with the correctness of the result, and makes it necessary to add alcohol to the liquid to be operated upon. Ph. Zeitsch. f. Russl. 1869, No. 1.

#### TETRATOMIC AND TRIBASIC ACIDS.

##### CITRIC ACID.

To examine Citric Acid for an admixture of Tartaric Acid. Blacher suggests the following test: Half a drachm of the specimen and fifteen grains magnesium bicarbonate are warmed in six drachms water. When a precipitate of magnesium tartrate is formed, the presence of a considerable percentage of tartaric acid is proved; if the solution remains clear the flask is dipped in cold water, and when cold, two ounces of strong alcohol are added, and the whole shaken. When, after a while, the liquid remains clear, the sample is free of any tartaric acid, for the slightest quantity of this acid will cause the solution to become turbid. Journ. de Pharm. d'Anvers, xxiii. 443.

*Isocitric Acid* is formed, according to Rochleder, when citric acid in aqueous solution is treated with sodium amalgam, care being taken to keep up an acid reaction of the liquid by the addition of dilute sulphuric acid. The isocitric acid may be obtained pure by a rather circuitous process, and then exhibits a crystalline mass, which has not yet been further investigated. Journ. f. prakt. Ch. 1869, No. 5.

*Chloral Hydrate.* Chloral, the aldehyde of trichlorinated acetic acid has been known for more than a quarter century. Recently, Dr. O. Liebreich, of Berlin, has established that the hydrate of chloral ( $C_2HCl_3O_2 + H_2O$ ) is to all appearance the most satisfactory anæsthetic and hypnotic, and is therefore a substitute for both chloroform and morphine. It is administered internally, as well as by subcutaneous injection. The principal product of its decomposition is chloroform. The pure chloral hydrate forms a white crystalline mass readily soluble in water and alcohol. Vid. Literature.

## ALDEHYDES.

## ALDEHYDES DERIVED FROM MONATOMIC ALCOHOLS.

## CAMPHOR.

The substance known in perfumery and pharmacy as *patchouli camphor* is, according to recent researches of Gal, homologous with Borneo camphor, and is represented by  $C_{30} H_{28} O_2$ . Patchouli camphor is solid, fuses between  $54^\circ$  and  $55^\circ$  C, and boils at  $296^\circ$  C. It is insoluble in water, readily soluble in alcohol and ether, and crystallizes in hexagonal prisms. The essence of patchouli is isomeric with the camphor, which is, it appears, simply formed by a molecular change. Bulletin mens. de la Soc. Chim. de Paris, No. 4, 1869.

## ALDEHYDES DERIVED FROM DIATOMIC ALCOHOLS.

*Aldehydine*. If aldehyde-ammonia, urea and ammonium acetate are heated together to  $120$ – $130^\circ$  C., an oil of the composition  $NC_{16} H_{11}$  = aldehydine is obtained. It floats upon water, in which it is slightly soluble; its boiling point is  $175^\circ$  C. *It smells like coniine*, from which it differs in composition by a minus of  $4H$ ; it cannot, however, be converted into the latter by the action of sodium amalgam. Ber. d. Deutsch. Ch. Ges. 145, 1868.

The constitution of coumarin, coumaric and melilotic acids have been the subject of researches by Mr. Perkins, and more recently by Rud. Fittig. The former succeeded in obtaining aceto-salicyl (hydride of aceto-salicyl) isomeric and identical with coumarin. By decomposition and by analogy with similar aldehydes, Fittig presumes that the aceto-salicyl is the anhydride of coumaric acid. The decomposition of coumaric acid into salicylic and acetic acids speaks greatly in favor of the view that the constitution is similar to that of cinnamic acid, and that it stands to this in the same relation as salicylic acid to benzoic acid.

By treatment with hydrogen in statu nascenti, coumaric acid is converted into melilotic acid, the same as cinnamic acid is converted into phenyl-propionic acid. Journ. of the Chem. Soc. 2 ser. vi. 53 & 181.

## CYANOGEN COMPOUNDS.

## HYDROGEN CYANIDE—HYDROCYANIC ACID.

*Formation of Hydrocyanic Acid.* M. Berthelot states that all hydrocarbon compounds produce acetylene under the influence of electrical sparks, that it appears that nitrogen, mixed with whatsoever hydrocarbon vapor, forms hydrocyanic acid, and that this acid may be formed by direct synthesis by the union of carbide of hydrogen and nitrogen under the influence of electric sparks. Ch. N. A. R. May, 1869, 250.

Prof. Wurtz, in a report on some researches, mentions the observation of Gautier, that *hydrocyanic acid* acts as a basis by uniting with hydrochloric acid to a compound analogous to chlor-ammonium. N. Rep. Ph. 18, 170.

*Hydrates of Hydrocyanic Acid.* M. Gautier made a few observations on the question of existence of well defined hydrates of hydrocyanic acid. The experiments of Bussy and Buignet, on the contraction of mixtures of water and hydrocyanic acid, led to a maximum contraction, corresponding to a mixture expressed by the formula  $2\text{CHN} + 3\text{H}_2\text{O}$ . Supposing that there exist hydrates with constant fusing point, the author made experiments with several mixtures made up of variable quantities of hydrocyanic acid and water in definite proportions; not one of these mixtures had a constant melting point. The author concludes that two definite hydrates may be said to exist expressed by the formulæ  $\text{CNH}, 11_2\text{O}$  and  $\text{CNH}, 2\text{H}_2\text{O}$ ; these, by combining together, produce the hydrate  $2\text{CNH}, 3\text{H}_2\text{O}$ . Bull. mens. d. l. Soc. chim. d. Paris, May, 1869.

*Detection of Hydrocyanic Acid.* Schoenbein has given a novel and very delicate reagent for the detection of hydrocyanic acid in the state of vapor, which is especially valuable in forensic cases. It consists of strips of paper imbued with a solution of guaiacum resin, and moistened with a solution of cupric sulphate at the moment of use. In contact with hydrocyanic acid, either in solution or diffused in the atmosphere, the prepared paper immediately assumes a blue color.

The solutions are made of three parts guaiacum resin in 100 parts alcohol; and one part of cupric sulphate in 500 parts water. London Ph. Journ., Jan. 1869, 430.

## ALLYL-ISOSULPHOCYANIDE.—OIL OF MUSTARD.

*Artificial formation of Mustard Oil.* When benzylamin (isomorphous with toluidin) is dissolved in bisulphide of carbon, and the resulting white crystallising body is distilled with alcohol and mercuric chloride, phenyl-isosulphocyanide is obtained, which in all its properties seems equal to allyl-isosulphocyanide. The oil is separated from the distillate by the addition of water. Ber. d. Deutsch. chem. Ges. No. 15, 1868.

## URIC ACID.

*Preparation from Guano.* In order to prepare the acid from guano on a large scale, J. Loewe devises the following method: Equal weights of guano and sulphuric acid are operated upon by adding the ground and dried guano, little by little, into the warm acid, continually stirring the mixture; when the evolution of gases ceases, the mixture is diluted with from 10 to 12 times its bulk of distilled water. A yellow precipitate ensues, which, when settled, is separated by decantation; it is then washed by repeated decantation, until the sulphuric acid is nearly removed; the precipitate is then, little by little, added to a boiling weak alkaline solution, and the uric acid precipitated from the alkaline fluid by means of hydrochloric acid. The crude uric acid thus obtained is purified by the process of either Wöhler or Heintz. Journ. f. prakt. Ch. 1868.

*Urine Analysis.* C. Neubauer publishes, in Fresenius Zeitsch. f. analyt. Ch. 1868, and in Viertelj. Sch. f. Ph. 18, 55, novel contributions to the urine analysis, too lengthy and concrete for a brief report.

## AMINES.

## MONAMINES.

*Anilin.* Toluidin, as well known, assumes a yellowish-brown color with calcium hypochlorite; if therefore it be contained in aniline, as is frequently the case, the latter will show the reaction of the former. This impediment will be overcome, however, by the addition of some ether which dissolves the brown coloring product and restores the blue anilin reaction. Zeitsch. f. anal. Chem. vi, 357.



## ORGANIC BASES.

## NATURAL ORGANIC BASES OR ALKALOIDS.

## CINCHONA ALKALOIDS.

*Solubility of Quinine.* F. Sestini instituted a series of experiments in order to establish its solubility, and states that:

1 part anhydrous quinine requires 1667 parts water of 20°C., and  
 1 part hydrate of quinine " 1428 " " " "  
 and that

1 part anhydrous quinine requires 902 parts water of 100°C., and  
 1 part hydrate of quinine " 773 " " " "  
 for solution.

Sestini states further that alkaline salt solutions, if of moderate strength, favor the solution of quinine; that the alkaline hydrates greatly diminish its solubility. *Zeitsch. f. anal. Chem.* vi, 359.

*Fluorescence.* G. G. Stockes communicated to the Brit. Chem. Assoc. the results of a series of experiments with relation to the fluorescence of quinine and the effect of the different acids and their salts upon this remarkable phenomenon. *Ch. N. A. Rep.*, May 1869, 254.

*Testing for Salicin.* M. Snoden has submitted the well known methods of examining quinine sulphate for salicine to comparative tests, and states that the three modes, viz., the old one by means of sulphuric acid, the mode of Bourlier, (*Journ. de Pd. de Ch.*, July, 1859, p. 34,) and the mode of Parrot, (*Proc.* 1868, p. 260,) answer the purpose satisfactorily, and that the old method, because of its simplicity, is the most convenient. Snoden ascertained, however, that this test requires the application of the monohydrated sulphuric acid, or Nordhausen oil of vitriol, otherwise the formation of the purple rutelin from the salicin will not be effected. But in order to prevent the carbonification of the quinine, any rise of the temperature of the mixture has to be avoided. *Upsala Läk. foeren. Foerhandl.* iii, 707.

*Excipient for Quinine.* Jas. Kemble, in the *A. J. Ph.*, Nov., 1868, 517, recommends the syrup of chocolate as an excipient for the administration of quinine, as it completely disguises its

bitter taste. Since, however, the addition of any acid calls forth the bitter taste, Kemble suggests to effect the solution of the quinine in the stomach by taking a suitable quantity of acid in the form of lemonade after the administration of the quinine.

*Quinine Arseniate.* F. Sestini suggests the following method for the preparation of arseniate of quinine: 14.2 parts of anhydrous quinine and 32.4 parts of arsenic acid are dissolved in 300 parts of alcohol, the solution is evaporated to half its original volume and is then left to spontaneous evaporation, when the crystals of the quinine arseniate appear. *Zeitsch. f. Anal. Ch.*, vi, 359.

*Quinine Valerianate.* Lalien suggests the following method for the preparation of quinine valerianate: Sufficient potassium hydrate is dissolved in alcohol to exactly neutralize the sulphuric acid contained in the quantity of quinine sulphate to be operated upon. Then the potassic solution is accurately saturated with valerianic acid. To this solution of potassic valerianate is added the equivalent quantity of quinine sulphate, and the resulting decomposition is accelerated by agitation. Finally the potassic sulphate is separated upon a filter, is washed with some alcohol, and the alcoholic solution of quinine valerianate is evaporated to crystallization. The yield corresponds in weight about to the quantity of the quinine sulphate operated upon. *Journ. de Ph. d'Anvers.*, xxiv, 289.

*Quinidine.* The numerous researches on the cinchona bases have been considerably entangled by the number of names and synonyms attributed to some of them, especially to the base, now properly designated quinidine. The researches of V. Heyningen, Pasteur, De Vrij and, recently, the elaborate studies of O. Hesse (*Ann. Ch. & Ph.*, 146, 257) have cleared up all confusion and established, with evidence, that the substances found, prepared and examined and called by the various investigators chinotine, cinchotine, pitayine,  $\beta$  quinine,  $\beta$  quinidine are all the same base now called quinidine, or by Hesse, conchinin, which latter name, however, had better be dropped in favor of the generally accepted name of quinidine. Hesse has prepared and studied the pure quinidine and a number of its salts.

*Quinoidine* or amorphous quinine is the well-known, dark colored, resin-like mass obtained from the refuse, or mother-liquors of the quinine manufacture. It is said to be identical in composition with quinine, and to bear to quinine about the same relation that uncrystallizable saccharose bears to ordinary sugar. Being a powerful febrifuge, it has recently again come in greater use. F. Jobst (N. Rep. Ph. xvii, 385) has prepared a readily soluble quinoidine citrate in scales, which he recommends as an excellent substitute for quinine when used as a febrifuge.

#### OPIUM ALKALOIDS.

*Detection of Morphine.* Dragendorff and Kanzmann have published, in the Ph. Zeit. f. Russl. and in Viertelj. Sch. f. Ph., xviii, 33 and 183, the result of a series of elaborate researches on the detection of morphine and narcotine in animal substances which are altogether too extensive for recapitulation in this report but which are highly interesting for toxicological science, and which probably will be published in a pamphlet.

*Apomorphia.* Aug. Matthiessen and C. R. A. Wright, in their investigations of the constitution of the opium bases, obtained a new base which they call apomorphia, by heating morphia with a large excess of hydrochloric acid to 140°–150° F. for two or three hours. After cooling, no gas is found in the tube, nor is there any formation of chloride of methyl. The residue in the tube contains the hydrochlorate of the new base. It may be obtained in a state of purity by dissolving the contents of the tube in water, adding excess of sodium bicarbonate, and extracting the precipitate with ether or chloroform, in both of which the new base is readily soluble, whilst morphia is almost insoluble in both menstrua. On shaking up the ethereal or chloroform solution with a very small quantity of strong hydrochloric acid, the sides of the vessel become covered with crystals of the hydrochlorate of the new base. These may be drained, washed with a little cold water, in which the salt is sparingly soluble, and re-crystallized from hot water and dried on bibulous paper, or over sulphuric acid.

This hydrochlorate contains no water of crystallization. After

drying it yielded results, on combustion with chromate of lead and oxygen, agreeing with the formula  $C_{17}H_{17}NO_2HCl$ . From a solution of the hydrochlorate in water bicarbonate of sodium precipitates a snow-white non-crystalline mass, which speedily turns green in the air, and is therefore difficult to obtain dry in a state of purity. This precipitate is apomorphia. It hence appears that the new base is formed from morphia by the abstraction of the elements of one equivalent of water.

When the hydrochlorate of apomorphia in a moist state is exposed to the air, it turns green from oxidation, as the change of color is accompanied by an increase of weight. The base itself, newly precipitated, is white, but it speedily turns green on exposure to air. The green mass is partly soluble in water, communicating to it a fine emerald color, in alcohol yielding also a green tint, in ether giving a magnificent rose-purple, and in chloroform a fine violet tint.

The physiological effects of apomorphia are very different from those of morphia; while the latter is a powerful narcotic, the use of which is apt to be followed by subsequent depression, the new base is free from narcotic properties, but is a powerful emetic, the action of which seems not to be attended by injurious after-effects. One-fourth of a grain produces vomiting. Ch. N. A. R., Aug., 1869, 83.

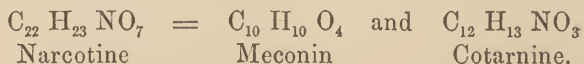
*Papaverin.* Dr. Leidersdorf has studied the physiological action of papaverin on man; he recommends the hydrochlorate in doses of from one-half a grain to one grain for internal use, and from three to five drops of a solution of six grains of the hydrochlorate of papaverin to 60 drops of water, for subcutaneous injection. It acts as a narcotic and soporific, and produces muscular relaxation. *Wochenbl. d. Zeitsch. d. Ges. der Aerzte in Wien*, 1868, No. 14, and *Am. J. Med. Sci.*, Jan., 1869, p. 237.

*Distinction between Morphine and Papaverine.* The double iodide of potassium and cadmium affords, according to W. W. Hoffmann and C. Schroff, a characteristic reagent for distinguishing morphine and papaverine, since it produces with the latter a white, shining precipitate, and white needles with mor-

phine, which are readily recognized under the microscope. Wien. Med. Wochenschr., 1868, N. 68, 936.

*Narcotin*.—The products of narcotin, when acted upon by oxidizing agencies, have been the subject of close inquiry by Wöhler, Blyth, Anderson, and recently by A. Matthiessen and G. C. Foster. The latter have communicated in a paper to the Royal Soc. Feb. 18, 1869, the results of their continued investigations on the constitution of narcotin, and came to the interesting conclusion that ordinary narcotin has the formula  $C_{22}H_{23}NO_7$ , that it includes three atoms of methyl which can be displaced, respectively substituted by hydrogen atoms, so that there is a homologous series of narcotins. Four of them were obtained; they are amorphous bases, and seem to have no marked physiological action.

A recent observation made by Matthiessen and Wright is especially noteworthy, as it explains the *origin of meconin in opium extracts*. By the action of water on narcotine, at an elevated temperature, the base splits up into meconin and cotarnine, thus :



This interesting discovery confirms the probable supposition that some of the numerous bodies which are named in analyses of opium are not actual educts, but merely products of decomposition. Proc. Norwich Meet. 1868, 57.

#### STRYCHNOS ALKALOIDS.

*Detection of Strychnine*. To detect the presence of strychnine in cases of poisoning, M. Cloetta suggests the following method: Any albumen which may be present in the liquid is first removed, subacetate of lead added, and the liquid filtered; the excess of lead is removed by sulphhydryc acid, another filtration made, and the filtrate evaporated to dryness. The residue thus obtained is left in contact with ammonia for 24 hours, then agitated with double its volume of chloroform, and the chloroformic solution evaporated; this residue is dissolved in 2 c. c. water containing pure nitric acid, the solution filtered, and to the filtrate one drop of a solution of potassium dichromate is



added. At the end of a few days crystals of strychnine chromate appear, in which the chemical characters of strychnine may be recognized.

The author affirms that, by this process, he has been enabled to prove the presence of one-twentieth grain of strychnine in 650 c. c. of urine. Ch. N. A. R. March, 1869, 142.

A still simpler process is given by Schachtrupp. It consists in saturating the suspected substance with ammonia, and allow it to dry spontaneously; then it is heated with a little amylic alcohol, after which a few drops of this liquid are added to sulphuric acid and potassium dichromate, when, if strychnia is present, the well known coloration will be obtained. Zeitsch. f. Anal. Chem. vii. 284.

(The method of Cloetta seems to be unreliable in some cases. Dragendorff's method is, as A. Masing has more recently, by elaborate investigations, ascertained, very reliable and accurate. Dragendorff, as will be remembered, uses benzol as a means to separate the strychnine. The method has been the subject of former reports, and has since been published. Vid. Literature.)

Dr. Richter, of Goettingen, some years ago, stated that animals poisoned with strychnine can be saved by artificial respiration, and when the muscles have been already paralyzed, by administration of curare. More recently, Prof. Rosenthal and Dr. Leube have shown that even fatal doses of strychnine, to a certain extent, do not at all take effect if the artificial respiration is applied at once. Rosenthal and Uspensky have obtained the same effect also in cases of poisoning with brucin, thebain and coffein, but failed to observe it with nicotin and picrotoxin. Ph. Centr. Halle, 1869, 11.

*Strychnine and Ammonic-Sulphhydrate.* Vid. page 201.

#### ACONITE ALKALOIDS.

*German and English Aconitine.* Merk, in Darmstadt, compared his aconitine with samples of commercial English aconitine. The former is soluble in 2 parts ether, 4.25 parts alcohol, and 2.6 parts chloroform. From all these solutions it is obtainable only in an amorphous resin-like state. It softens in boiling

water, can be kneaded, and becomes brittle after cooling. The English aconitine, however, is but slightly soluble in ether, and still less in alcohol and chloroform; from its solution in boiling ether or alcohol it crystallizes. It does not soften in hot water. Merk concludes that the English aconitine cannot be accepted as an official aconitine, the less, as recent experiments have evinced that the crystallized aconitine is far less effective than the amorphous one. London Ph. J. Oct., 1868, 248.

Hübschmann has subjected the English aconitine to repeated investigations (Schweiz. Woch. Sch. f. Ph. 1867, 405, *ibid.* 1868, 189.) His results are identical with Merk's. Hübschmann found further, that English aconitine does not dissolve in cold benzol, remaining pulverulent, but it dissolves when warmed, and separates again on cooling, partly in crystals, partly amorphous. Sulphuric acid does not change the English aconitine, whilst it dissolves the German with a yellow color; the latter, when brought into benzol, assumes the form of resinous drops, which gradually dissolve. According to Hübschmann, one part of the English aconitine requires for solution 100 parts warm ether, 20 parts boiling alcohol, and 250 parts chloroform.

This variance of official aconitine finds its explanation by the statement (Ph. Centr. Halle, No. 13, 1869), that aconitine in England, to all appearance, is obtained from the roots of *Aconitum ferox*, Wall., which grows upon the slopes of the Himalaya Mountains, the tubers being extensively brought into commerce. They are richer in aconitine, but this, to all appearance, differs from that derived from *Aconitum napellus*, L. The root of the latter even is the official of the British Pharmacopœia, and Hager agrees with Merk, that the aconitine prepared from *Aconitum napellus*, L., at present, can be the only aconitine admissible for medicinal use.

#### ALKALOIDS OF SOLANACEÆ.

*Hyoscyamine.* By Prof v. Schroff's experiments with Grandvall's Extracts, it appears that hyoscyamine surpasses atropine in its mydriadic effect, and that a thousand-fold dilution sufficiently expands the pupil of the eye. N. Rep. Ph. xvii. 335.

## ALKALOID OF IPECACUANHA.

*Emetine.* Processes for the preparation of this alkaloid have successively been introduced by Pelletier and Magendie, by Dumas, by Leprat, by Rabourdeis and others. Recently J. Lefort has suggested an improved method :—the powdered ipecacuanha is exhausted by percolation, first with alcohol of 86 per cent. and subsequently with alcohol of 56 per cent. ; the united tinctures are distilled to recover the spirit, and the residue is evaporated to a syrupy consistency ; this extract is poured into a well-stoppered bottle, and for every 100 parts of ipecacuanha which has been operated on, two parts of potassium hydrate, dissolved in a little water, are added, together with a volume of chloroform nearly equal to that of the mixture. As the emetine is very soluble in potash, and as the alkaline solution rapidly absorbs oxygen from the air, the flask should be completely full. The mixture is agitated and allowed to repose for some days ; the chloroform separates and collects at the bottom of the flask ; it is removed by a pipette, and replaced by a fresh quantity. The alkaline liquid may be considered to be exhausted when the chloroform comes out colorless, or almost so. The chloroform solutions are then mixed and distilled to recover the chloroform. The residue is deep brown, and is composed principally of emetine and a resinous matter ; they are separated by treatment with a weak acid, which dissolves only the alkaloid. The solution is exactly decomposed by ammonia, avoiding any excess thereof. The emetine is washed by decantation, and finally dried. It forms a light whitish powder of bitter taste, turns slightly brown in the air, but does not absorb moisture. Journ. de Ph. & Ch. April, 1869.

*Separation of the Alkaloids in Forensic Analysis.* Dragendorff publishes a continuation of his former essay (N. Rep. Ph. xv, 593—499) a series of elaborate researches in regard to the separation of the most important alkaloids in forensic analysis. The author substitutes the use of benzol and amyl alcohol by that of chloroform and the so-called petroleum ether, (that part of petroleum obtained and purified by fractional distillation between 35° and 80°C.) N. Rep. Ph. xiii, 281—306.

Häger suggests the trinitrophenyl (picric acid) as a *reagent* which precipitates a number of *alkaloids*, and which has the advantage over the usual precipitants, to facilitate the process of washing. When vegetable substances are to be examined for the amount of alkaloids contained in them, they have to be digested with water acidulated with sulphuric acid. The filtrate is then tested with an excess of a saturated solution of trinitrophenol. The following alkaloids are precipitated:—strychnine, brucine, veratrine, quinine, quinidine, cinchonine; the following are not precipitated,—atropine, morphine, coffeine, and most glucosides. Ph. Centr. Halle. 1869, No. 17.

## UNCLASSIFIED ORGANIC COMPOUNDS.

### ORGANIC COLORING PRINCIPLES.

#### INDIGO.

*Solubility of Indigo.* C. Koechlin has discovered the curious fact of the solubility of indigo in the salts of some of the alkaloids, particularly in the acetates and chlorides of aniline, morphine, etc. Ch. N. A. R. May, 1869, 263.

*Estimation of the Value of Indigo.* G. Leuchs estimates the indigo-blue, the chief valuable constituent of indigo, in the following manner:—by means of 35 grms. of lime and 30 grms. of protosulphate of iron, 10 grms. of indigo are dissolved in three litres of water. In order to exclude the access of air, some petroleum was poured on the top of the fluid. The experiments led to the result that this solution reduces an equal equivalent of ferric oxide, and that this reaction proceeds as expressed by—

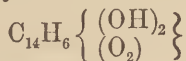


In order to test any sample of indigo, 1·31 grms. thereof are so mixed with lime and ferrous sulphate as to form a solution measuring 300 c. c., which is put into a cylindrical glass vessel provided with a well-fitting glass stopper. To 100 c. c. of the solution thus obtained, 66⅔ c. c. of a solution containing  $\frac{1}{10}$  equivalent of iron alum acidulated with sulphuric acid are added; this mixture is filtered, and 100 c. c. of the filtrate are taken and titrated with a solution containing  $\frac{1}{10}$  potassium bichromate,

which is best run into the indigo containing fluid from a burette having divisions of  $\frac{1}{2}$  c. c., in which case every division is equal to one per cent. indigo-blue. Zeitsch. f. Ch. 1869, No. 9.

*Reduction of Indigo-Blue.* According to A. Baeyer, indol may be obtained directly from indigo, by treating the latter with tin and chlorhydric acid. A green substance, a compound of indigo-white with suboxide of tin, is first formed, which on continued heating becomes yellow, being converted into a compound of tin with a further reduction of indigo-blue. This yellow compound, mixed with a little water and powdered zinc, when heated gives out indol in large quantities. Ber. d. Deutsch. chem. Ges. 1868, 17.

*Alizarine.* For a number of years past many chemists have tried to obtain the valuable alizarine by artificial means. In 1861 M. Roussin thought he had succeeded, by withdrawing from binitro-naphthaline two equivalents of oxygen, and by converting at the same time the nitrogen into ammonia. Although this experiment was unsuccessful, it has, no doubt, been made the starting point for the important solution of this problem, which Graebe and Liebermann, at Berlin, have recently brought to a successful issue. By heating alizarine with zinc dust, a hydrocarbon was generated, which, instead of naphthaline, proved to be paranaphthaline, (anthracene,) which, according to the researches of Anderson, Fritzsche, Limpricht, and Berthelot, has the formula  $C_{14}H_{10}$ . This fact caused alizarine to be considered as a derivative of anthracene, and to admit for it the composition of  $C_{14}H_8O_4$  expressed by the rational formula :



It will be observed that this formula differs from that of anthracene only by having 2 atoms=4 equivalents of oxygen more, and 2 of hydrogen less, than that of anthracene.

Having thus obtained anthracene as a product of alizarine, the same chemists have succeeded in solving the inverse problem, viz : the artificial preparation of alizarine by means of anthracene.

The process of this transformation of paranaphthaline into alizarine, is described at length in Ber. d. Deutsch. chem. Ges. zu



Berlin, ii, 14, and in Ch. N. A. R. June, 1869, 303, and in Monit. Scientific, No. 296, April 15, 1869.

Considering the enormous consumption of madder in dying and printing, this remarkable discovery, being the first instance of the artificial formation of a natural coloring matter, will, it is to be hoped, become of great practical importance when the means should be found to render it universally applicable.

#### FERMENTS.

M. Mialhe, at a meeting of the Soc. de Pharm., gave an account of his researches on the preservation of ferments. The conclusion to be drawn from these researches is, that physiological ferments will retain indefinitely their action when suitably dried. This fact confirms the assertion of Rouchoux relative to the activity of dry vaccine lymph, and of Mangili, relative to the dried poison of the snake. Ch. N. A. R., Sept., 1869, 149.

#### ANIMAL CHEMISTRY.

##### MILK.

Heretofore the *casein of the milk* was believed to be kept in solution by the alkaline state of the milk. Müller has shown that casein can form a modification which is soluble in water, and that this modification is the same as in natural milk. Müller bases his conclusions upon the following experiments: Casein, when precipitated by weak acids and washed and dried, was redissolved, one part in dilute sodium hydrate, another one in a solution of sodium phosphate. Both of these solutions were submitted to dialysis on a star filter of parchment paper. Within twenty-four hours the sodium hydrate, as well as the sodium phosphate, had passed through the vegetable tissue, while the dialyser contained a liquid of the same appearance as before, which was neutral, did not change when boiled, and yielded a precipitate of all its casein on the addition of alcohol or diluted acids. Journ. f. prakt. Chem., 103, 49.

M. Commaille established the presence of *kreatinine in decomposing milk*. He believes it to be formed by dehydration from kreatine, already present in the milk. Ch. N. A. R., March, 1869, 142.

*New Color Test for Blood.* A mixture of guaiacum tincture (resin or wood?) and peroxide of hydrogen dissolved in ether is said to produce a distinctly blue tint with blood, blood stains, etc., even when they are as old as twenty years. *Lancet*, March 20, 1869, and *Am. D. C.*, Aug., 1869,

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## PHARMACEUTICAL LEGISLATION, STATISTICS AND PRIZE SUBJECTS.

*Great Britain.* With the new pharmacy act of 1869 British pharmacy has commenced to abolish many obsolete and detrimental usages. It will, however, require years before the effect and the working of the new law can be measured and justly appreciated. In Germany the present English poison law is considered as inadequate to the standard of modern legislation in pharmacy. That this view is not groundless has already been verified by several preparations of opium and opiates, which have since been gotten up in England under pretended or secret names and forms, and are sold partly through illicit channels.

*France.* The consequences of free trade upon French pharmacy and pharmacutists call forth more and more serious consideration. Dorvault, one of the most prominent pharmacutists of France, gives expression to the present unsatisfactory state of French pharmacy in a paper—"La pharmacie française du présent, de ses réformes," (*L'union pharmaceutique*, No. 5, 1869.) In a review on the subject, Dorvault makes the following concluding remarks: "The practice of pharmacy as conducted in France (as a free trade) means to expose the life and happiness of our fellow-men to a mischievous imposition; it means to fall back into mediæval conditions, and to sacrifice achievements accomplished and arrived at by the toil, the genius and the means of civilization during centuries. Pharmacy ought not and cannot be made an unrestricted trade, open to every imposter and to incompetency. The pharmacist must be made responsible to the government and to the law, and pharmacy must be conducted in accordance with all requirements for the

public weal and with the intelligence and the spirit of the age. Pharmacy is less a mere trade than a public office of trust. The true interest of humanity raises the duties of the pharmacist as well as of the physician, however trifling and subordinate they may appear in detail, to the height of the noblest professional functions."

*Germany.* In northern Germany laws are in course of preparation calculated to facilitate the practice of pharmacy and to modify the old privileges.

The great laboratories at the Universities of Berlin, Bonn and Leipzig have been finished. They will, in connection with those famous Universities and under the guidance of the best chemists of our day, continue to be seminaries of the chemical sciences and related technical occupations.

*Italy.* The practice of pharmacy has been the subject of contemplation of a government commission, charged with reporting a new pharmacy code. The practice is left free to competition in principle, but under the double guarantee of the diploma and governmental surveillance. This restriction on absolute liberty is in accord with public opinion and interest, and prevents the encroachments and inconveniences of the illicit sale of pharmaceutical products.

A common Pharmacopœia for united Italy, under the editorial care of Prof. Semnola, is in progress. •

Italy, including the Papal States, had, in Dec., 1868, 10,307 pharmacists, which makes one for every 3433 inhabitants.

*Spain* enjoys comparatively good medical institutions and laws. Its present Secretary of the Interior has abolished old abuses. He has freed the universities of the guardianship of the church, and has given them self-government and freedom of instruction; he has opened their lecture-rooms, collections and libraries to the general use and benefit; he has nominated, in all the Provinces, Medical Boards, composed of a physician, a pharmacist and a lawyer, and under his direction a commission of competent experts is at work to suggest a reform of the legislation on medicine and pharmacy, which, when finished and approved, will be submitted to the consideration and adoption of the Cortes.

*Holland* enjoys new legislative reforms in pharmacy since 1865; they apparently work to the general satisfaction. Holland, as is well known, has free trade. In December, 1868, there were, with three and a half millions of inhabitants, 909 pharmacies; accordingly, one to every 3,850 inhabitants.

The decimal weight will be introduced obligatorily in the pharmaceutical practice in Holland, on and after the 1st of January, 1872.

*Austria.* The new Pharmacopœia has made its appearance.

A reform of the medical laws is intended, the labor having been entrusted to a commission of competent professional delegates.

*Rumœnia.* Since the first of January of the present year, the new medical codex of the 30th November, 1867, has become a law.

*Russia.* In Russia pharmacy is principally in the hands of Germans, and is to all appearance an established profession. Pharmaceutical education and the practice of pharmacy are regulated somewhat like those in Germany, and the pharmaceutical chairs at the Universities of St. Petersburg and Dorpat are in excellent hands. The pharmaceutical associations in Russia seem to be in a flourishing state.

*United States.* The urgent necessity of proper legislation regulating the practice of Pharmacy and the sale of poisons, and for the prevention of adulterations and misuses of drugs and medicines, becomes more and more impressed upon the public. In no civilized country, perhaps, are the existing laws in this respect so totally inadequate, and a dead letter, and scarcely any community is exposed to criminal incompetence and imposture to such an extent, without adequate punishment, as ours. For the very reason of our republican institutions, the exercise of a profession with such momentous responsibility ought to be restricted to competent and conscientious persons only. Another remedy of those crying evils of which we hear so frequent and just complaints, is to give the pharmacist an education corresponding with general progress. These conditions can only be met through the enactment of suitable laws, and through the

creation of some competent authority having control of the education of pharmacutists, and responsible for the vigorous enforcement of the laws.

Surely it becomes this Association to anticipate all legislative action by taking the initiatory steps in this much needed reform.

An event of special importance to pharmacy will happen during the coming year, which ought to claim the serious consideration of this Association, though it, unhappily, cannot be directly represented in the National Convention for the decennial revision of our Pharmacopœia, which will meet in Washington, D. C., on the fourth of May next. The considerable progress of pharmacy during the last ten years, the rapid increase of the means and the consequences of international communication, and the continued influx of European emigration and education, render a thorough revision, and perhaps a partly new edition of our national Pharmacopœia, desirable and necessary. The committee of revision will have to examine not only the vast material accumulated during the last ten productive years, but it will also have to meet the just claims of the increasing number of accomplished practitioners of medicine, well acquainted, and justly appreciating the excellence of some European Pharmacopœias, and therefore will have to give due consideration to the acknowledged superiority of such standard works as the Prussian Pharmacopœia and the new Pharmacopœia Germanica.

It would also be well to consider whether the time has not yet arrived, simultaneously with the effort to legally regulate the practice of pharmacy, to make the effort to legally recognize the United States Pharmacopœia, and make it obligatory upon the practice of pharmacy throughout the United States.

Convinced by a comparative survey of the pharmaceutical literature of the day, it may not be inopportune in this place to direct the attention of our young pharmacutists to a point which has been, and still is, often pressingly urged upon the students of our American colleges, by such men as Edward Everett, L. Agassiz, Longfellow, G. Bancroft, Emerson, Bayard Taylor and many others, namely: to study, if it has not already been accomplished by their previous education, the German language, at



least so far as to be able to read it, and thus to partake of the advantage of the excellent and vast literature which that language possesses in all branches of sciences and arts.\* The impress of this want being confessedly perceptible in a greater or less degree in all our scientific literature, this lack is strikingly observable and felt in the pharmaceutical and collateral literature.

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The third international Congress of Pharmaceutical Societies and Associations will convene simultaneously with the 17th Annual Meeting of this Association, at Vienna, in Austria.

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#### PRIZE QUERIES FOR 1870.

*England.* The Pharmaceutical Society offers the botanical prize for 1870 for the best herbarium, collected in any part of the United Kingdom. Time of delivery, before the first of July, 1870.

*France.* The Société de Pharmacie has offered a prize for the discovery of the artificial preparation of quinine, or a new organic compound with equal therapeutical effect. Open to all. Time of delivery, before the first of July, 1870.

The Pharmacie Centrale of France offers a prize for the best treatise on the right and duties of the drug clerks, (a des pharmaciens).

*Germany.* The annual prize-query of the Hagen-Buchholz'schen Stiftung is a comprehensive examination of cubebs, their components and their preparations. Time of delivery, August 1, 1869.

\* "The German nation have been continually growing and showing themselves the foremost scholars of the world. They have a certain pace, one may say, a certain endurance, a certain power to labor, which leaves all other scholars behind them. They know very well their strength, and the nations are getting to know it. It has been said of that people, 'It is not the battle of Leipzig, but it is the Leipzig catalogue which raises them above other European nations.' The German reads a literature while we are reading books, and we get more scientific facts from that country than from any other."—*Ralph Waldo Emerson, in his Boston speech at the Humboldt Centennial Celebration, Sept. 14th, 1869.*

The annual prize-query for apprentices in pharmacy is:— Examination of the commercial magnesium carbonate from various manufacturers and countries, and the determination of the quantity of water contained in each sort of magnesia.

*Switzerland.* The Schweizerische Apotheker Verein offers a prize for the best essay on the chloracetic acids and their preparation. Time of delivery, August 1, 1869.

*Russia.* The medical faculty of the University at Dorpat offer a prize for the best researches on the constitution of Picrotoxin, with particular reference to the still questionable character of this principle as a glycoside.

## OBITUARY.

### PHYSICISTS AND PHILOSOPHERS.

Pouillet, Claude Servais Matthias, born at Cuzane (Doubs,) 1791, died at Paris, June 3, 1869.

*Foucault, Leon*, born 1819, died Febr. 12, 1869, at Paris.

*Oberhäuser, Georg*, born 1801, at Munich, died 1869, at Paris.

Plücker, Julius, born 1801, at Elberfeld, died May 22, 1869, at Bonn.

Carus, C. G., born 1788, died July 28, 1869, in Dresden.

### CHEMISTS.

*Schænbein, Christian F.*, born Oct. 18th, 1799, died at Baden-Baden Sept. 4, 1868.

Persoz, Jean François, died Nov. 12, 1868, at Paris.

Nicklès, Jerome, born in the Alsace, died April 2, 1869, at Nancy.

*Reichenbach, Karl von*, born 1788, at Stuttgart, died January 19, 1869, at Leipzig.

Scherer, J. S., born 1814, died Feb. 17, 1869, at Tübingen, (Germany.)

Werther, August Friedr. Karl, born 1815, at Roslau, died June 28, 1869, at Königsberg, (Prussia.)

Ullgren, Clemens, died Nov. 9, 1868, at Stockholm.

## PHARMACEUTISTS.

Bley, Karl Ludwig, born 1801, at Bernburg, died *ibid.* May 13, 1868.

Winkler, F. L.. died in Darmstadt, Sept. 6, 1868.

## BOTANISTS.

*Martius, Karl Friedrich Philip von*, born 1798, in Erlangen, died Dec. 13, 1868, at Munich.

Schnitzlein, Adalbert, born 1814, died Oct. 24. 1868, at Erlangen.

## ZOOLOGISTS.

Poeppig, Eduard, born 1798, at Plauen, died Sept. 4, 1868, at Wahren, near Leipzig.

Serres, August, born 1787, died Jan. 24, 1868, at Paris.

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G. Birkett, Thompson's Conspectus, adapted to the British Pharmacopœia. Longman's. London, 1868.

Guhler, Commentaires thérapeutiques du Codex medicamentarius, etc. Paris, 1868. Baillière.

Dispensatorio farmaceutico accomodato ai bisogni agli usi ad all' economica dell ospedale maggiore di Bergamo. Bergamo, 1868.

#### BOTANY.

J. Sachs, Lehrbuch der Botanik nach dem gegenwärtigen Stande der Wissenschaft. Leipzig, 1868. Engelmann.

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Th. Liebe, Die Elemente der Morphologie. Berlin, 1869. Hirschwald.

F. Unger, Botanische Streifzüge auf dem Gebiete der Culturgeschichte. Wien. Gerold, 1868.

Jul. Wiessner, Einfluss der Erdschwere auf Groessen- und Formverhältnisse der Blätter.

H. Hager, Botanischer Unterricht für angehende Pharmaceuten. Springer. Berlin, 1869.

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- W. Oddling, A Course of Practical Chemistry, arranged for the use of medical students. Reprinted by H. C. Lea. Philadelphia, 1869.
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- G. Dragendorff, *Die gerichtlich-chemische Ermittlung von Giften in Nahrungsmitteln, Luftgemischen, etc.* St. Petersburg, 1868.
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- A. Payen, Précis de chimie industrielle à l'usage, &c. 5<sup>e</sup> édit. Paris, 1869.
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- A. Casselmann, Analyse des Harns. St. Petersburg, 1868.

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- A. Deschanel, Traité élémentaire de Phisique. Paris, 1869.
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\* A most useful work, now regularly published, under the auspices of the Statistical Bureau of the Prussian Government.

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## CONCLUDING REMARKS.

Since the alteration of the Constitution of this Association, in 1856, a committee for the purpose of reporting on the progress of pharmacy is annually appointed, and it is evidently contemplated, by the creation of this institution, to furnish the members of the association with a complete periodical review of the professional

literature during the year. Since that time the sciences, and consequently the scientific material, have grown in volume and value, and it is questionable whether at present the knowledge, the faculties, and the labor of one individual man, upon whom also the fulfillment of practical business duties depends, may be regarded as sufficient to assimilate the vast material of the pharmaceutical literature, and of its collateral sciences, and to reproduce the same in a condensed and lucid form within a specified time.

The introduction into many branches of human labor and research of the principle of the division of labor has accomplished a great deal, and has successfully met this question by the introduction into modern literature of a new feature, that of the so-called "Annuals" (Jahresberichte); it has been particularly useful and subservient in the natural sciences, and in all vocations based thereon. The scientific annuals of the German literature are unexcelled by their comprehensiveness and solidity, and they embrace all branches of science and industrial pursuits.

In surveying the reports on the progress of pharmacy, contained in the successive volumes of the Proceedings of this Association, all competent of judging, whether and to what extent these papers give a true picture of all the material relating to pharmacy, and published during each year, whilst recognizing the labor and industry of the reporters, cannot fail to observe that a reproduction of the scientific and practical researches and labors in such a manner as to furnish a substitute for original sources of the pharmaceutical literature, has neither been nor, for the above reasons, will be attained by one who follows a pursuit, which excludes almost completely undisturbed leisure and tranquil meditation and labor.

The arguments just adduced are sufficient to warrant the conviction, that the suggestions of former chairmen regarding the desirableness of a permanent reporter on the progress of pharmacy, with whom I fully agree in principle and intention, will not fully meet the case. The extensive material, its increasing volume and variety, require the attainments and the labor of several persons, and larger space, in order to reproduce satisfactory reports thereof. I am, therefore, convinced that a reform is ne-



cessary for this institution of the Association, so excellent in its purpose. This reform would contemplate the elaboration by more than one person of an enlarged annual report, limited in volume only by the relative value or lack of value of the material presented. The increase in the cost of publication would probably be more than compensated by an increased sale of the Proceedings, or of this report alone, if in the hands of a publisher, since our literature as yet does not possess such annual reviews.

To provide for this want, which each succeeding year is felt more potently, would be very becoming for this Association, in which case the third section of the fourth article of the Constitution would have to be amended, by substituting for the present nominal committee a committee of three competent members for the term of about three years. With the material, labor and talent properly divided, their united efforts might produce a comprehensive annual report on the progress of Practical Pharmacy, on Pharmacognosy, and on Pharmaceutical Chemistry, which, besides being incorporated into the proceedings, might be published in book form by authority of the Association.

In closing this report, I thank the Association for the credit accorded to me by its appointment as chairman of the Committee on the Progress of Pharmacy. Being well aware of the deficiencies and shortcomings of the report, I trust it will meet a kind consideration. Knowledge gives power, says a well known proverb, but may I add—nothing is better adapted to deprive the mindful of all arrogance and vanity, than true knowledge and learning. Whosoever embarks upon the vast ocean of the physical sciences, cannot but be deeply impressed by the grandeur and immensity of nature's works and phenomena; for in whatever realm and in whichever vocation we may scrutinize them, whether by the microscope or the telescope, whether we may inquire into the unceasing material transformations, or bring nature's latent forces into action, in the minutest atom of the terrestrial matter, as well as in the immensity of the universe, they signalize conformity and perfection throughout the creation, and remind us of the littleness and vicissitudes of human doctrines, and of the comparative insignificance and imperfectness of our knowledge and learning, and how much there is of which we are still ignorant.















